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ENVIRONMENTAL ASSESSMENT BOARD



ONTARIO HYDRO DEMAND/SUPPLY PLAN HEARINGS

VOLUME: 13

DATE: Tuesday, May 14, 1991

BEFORE:

HON. MR. JUSTICE E. SAUNDERS	Chairman
DR. G. CONNELL	Member
MS. G. PATTERSON	Member

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ENVIRONMENTAL ASSESSMENT BOARD
ONTARIO HYDRO DEMAND/SUPPLY PLAN HEARING

IN THE MATTER OF the Environmental Assessment Act,
R.S.O. 1980, c. 140, as amended, and Regulations
thereunder;

AND IN THE MATTER OF an undertaking by Ontario Hydro
consisting of a program in respect of activities
associated with meeting future electricity
requirements in Ontario.

Held on the 5th Floor, 2200
Yonge Street, Toronto, Ontario,
on Tuesday, the 14th day of May,
1991, commencing at 10:00 a.m.


VOLUME 13

B E F O R E :

THE HON. MR. JUSTICE E. SAUNDERS	Chairman
DR. G. CONNELL	Member
MS. G. PATTERSON	Member

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1 ---Upon commencing at 10:02 a.m.

2 THE REGISTRAR: This hearing is now in
3 session. Please be seated.

4 MITCHELL PIERSON ROTHMAN,
5 PAUL JONATHAN BURKE,
6 LILY BUJA-BIJUNAS; Resumed

7 THE CHAIRMAN: Mr. Thompson, you are
8 first this morning, and then are you next, Ms. Kleer,
9 and then you, Ms. Marlatt, the way it is going. Who
10 follows Ms. Marlatt?

11 MS. MARLATT: It should be counsel from
12 OMAA and NAPA.

13 THE CHAIRMAN: Is there anyone here from
14 the Solar Energy?

15 MR. B. CAMPBELL: I have seen Mr.
16 Grenville-Wood this morning. I don't believe he is in
17 the room right now.

18 THE CHAIRMAN: Where does he fit into the
19 order?

20 MS. KLEER: He was originally supposed to
21 go before me and I have arranged to go before him. I
22 don't know what is happening after.

23 THE CHAIRMAN: Then you have had no
24 discussions with him? Do you care?

25 MS. MARLATT: About the order?

THE CHAIRMAN: Yes.

1 MS. MARLATT: Well, depending on NAN and
2 Treaty #3's cross-examination, it may be unnecessary
3 for us to cross-examine, so I am not particularly
4 concerned.

5 THE CHAIRMAN: I think it's logical that
6 you should follow on. But he is in from Ottawa, I
7 suppose, for the day. So, that may be another thing we
8 may have to take into account.

9 All right, Mr. Thompson.

10 MR. THOMPSON: Good morning.

11 CROSS-EXAMINATION BY MR. THOMPSON:

12 Q. Panel, with reference to
13 Interrogatory No. 1.16.3, could you --

14 THE CHAIRMAN: Have we got that?

15 THE REGISTRAR: It is in front of you,
16 Mr. Chairman.

17 THE CHAIRMAN: I've got it.

18 MR. THOMPSON: I thought my own filing
19 system was the only one that was slightly confused.

20 Q. Please confirm for the record that
21 the end-use model does include a number of sectors in
22 the primary agricultural sector.

23 DR. BUJA-BIJUNAS: A. I want to make
24 sure I understand.

25 Q. The question is that you have

1 considered various sectors of agriculture, dairy and
2 swine and so on, in your end-use model.

3 A. I was just wondering what you meant
4 by primary sectors in agriculture. Yes, poultry,
5 grain, dairy, swine, et cetera.

6 Q. Would I be also correct in
7 understanding that the agricultural demand management
8 programs have been included in load forecasts?

9 A. They have been included to obtain the
10 primary load forecast, yes.

11 Q. And am I correct in understanding,
12 also, that all forecasts incorporate an analysis of the
13 impacts of the Free Trade Agreement?

14 MR. ROTHMAN: A. Yes.

15 Q. Now, with reference to Interrogatory
16 1.16.1, which is the last page of this particular
17 document, would I be correct in assuming that while
18 Ontario Hydro realizes Free Trade and/or the Uruguay
19 round effects might change the use of electricity in
20 food processing industries, there has not been the
21 need, as of yet, to adjust or recalculate the end-use
22 model?

23 DR. BUJA-BIJUNAS: A. That's correct.

24 Q. Now to a hypothetical question.
25 Should our, in agriculture, worst fears about the

1 existence of marketing boards be realized, in that
2 unknown portions of our dairy and poultry production
3 and/or processing shut down, what might be, if any, the
4 overall effect on electricity use in Ontario?

5 A. I guess if I answer that in the most
6 direct way, to the extent that all these operations do
7 use electricity, and if they were to shut down, that
8 electricity demand would not then materialize. Am I
9 interpreting your question correctly?

10 Q. You might say that there would -
11 because of the size of the industry - there may be an
12 insignificant change in the total demand.

13 A. Currently, the agricultural sector
14 accounts for about one terawatthour, so it's a very
15 small percentage of total demand within the province.

16 Q. That is the answer I was looking for.

17 With reference to Interrogatory 116.3,
18 again, would I be correct in understanding that the
19 forecast for electricity consumption in the dairy and
20 swine sector are based on projections of farm cash
21 receipts, rather than physical units of production,
22 even though other sectors appear to be measured by
23 physical units of production?

24 On the middle of this first page of
25 Interrogatory 1.16.3, it indicates that the dairy and

1 swine sectors are measured by farm cash receipts,
2 whereas, on the top of the second page, it talks about
3 electricity intensity, electricity per unit of output,
4 of the sector.

5 And would I be correct in understanding
6 that the dairy and swine sectors are the only two that
7 are measured by the use of a cash income method rather
8 than a unit of physical output?

9 A. Just give me two seconds, please.

10 That is correct. The reason behind that
11 is about two years ago, when we started end-use
12 forecasting, our model did not specifically look at
13 dairy and swine; it only looked at a few types of
14 agricultural operations. And so we never had any
15 physical forecasts for dairy and swine.

16 Last year was the first year that we put
17 some effort into looking at the electricity use in
18 these two types of operations. But at that point, we
19 still had not geared ourselves up to producing physical
20 unit forecasts for those two areas, so we are in an
21 interim. Currently, we are looking at putting together
22 a better tool, a better estimate of dairy and swine
23 production for the 1991 forecast.

24 So, it's more an evolution of forecasting
25 for the agricultural sector.

1 Q. I think you have anticipated my next
2 question. I was somewhat concerned that in,
3 especially, the swine sector, as I recall, that cash
4 prices could be going in one direction--

5 A. Very much so.

6 Q. --whereas electricity use could be
7 going in the other, and I was --

8 A. Farm cash receipts, we have noted,
9 have a lot of problems with them as an indicator of
10 what's actually going on, in that particular sector.
11 It was just used temporarily as a stand-in for last
12 year's forecast and will not be used for this year's
13 forecast.

14 Q. So I would be correct in
15 understanding, then, that in this year's and future
16 years' forecast, you will be attempting to--

17 A. Do it in more physical terms.

18 Q. --do it on a physical unit of
19 production, rather than--

20 A. That's correct.

21 Q. --the income which was a temporary
22 measure at best?

23 A. That's correct.

24 Q. Now, my last question on this is what
25 other sectors of the end-use model might be using

1 similar types of analysis in this sort of evolutionary
2 process. I just happened to come across one example
3 where you were using something other than the--

4 A. The direct physical, yes.

5 Q. --appropriate data.

6 A. Food and beverage comes to mind. The
7 reason why we use value-added, for example, for food
8 and beverage is, because there is such a wide gamut of
9 projects produced in that industry, it is very
10 difficult to focus in on just one particular physical
11 product.

12 So, although end-use forecasting tries,
13 to the extent possible, to look at production in
14 physical terms, sometimes the nature of the industry is
15 such that you just can't do it.

16 The chemical industry is another example
17 where we do isolate out, in physical terms, about 6
18 chemicals: sodium chloride, chlorine, ethylene, oxygen
19 nitrogen, et cetera, but that accounts for about 30-odd
20 per cent of electricity consumption. The rest of
21 electricity consumption is due to such a wide, wide
22 range of chemicals, it would be very difficult to
23 produce physical forecasts for every single chemical,
24 so there again, we use a more aggregate value-added
25 estimation.

1 Q. Thank you. Now, as follow up to Mr.
2 Greenspoon's questions about the measurement of GDP, I
3 can't help but wonder about how one measures GDP output
4 realized, and the resulting electricity usage, where
5 people are multiple job-holders. As a background for
6 this, the OFA has a theory which could be entirely and
7 very easily faulty.

8 Part of the reason so many people are
9 unemployed is that farmers are "stealing" those jobs to
10 support their farms. Thus, it would seem that GDP
11 might be skewed, in that, a farmer, for example, might
12 be contributing to GDP both in his job and on his farm,
13 which would normally be the contribution of two people,
14 but in this case, it is only by one.

15 A case in point is a personal example. I
16 am running my farm while I am here, and I wouldn't even
17 ask you to comment how being at this hearing might
18 contribute to GDP, except my income is going to go up,
19 that the GDP would, I guess, be going up.

20
21
22
23
24 ...
25

1 [10:15 a.m.] I have three questions on this, I will
2 ask them all at once because they may be easily able to
3 answer all at the same time.

4 Does this sort of multiple job scenario
5 skew the accuracy and reliability of the GDP?

6 Second, is this a temporary phenomenon or
7 a permanent part of society?

8 And threee, what does this mean, if
9 anything, in electricity usage, because that's what we
10 are trying to forecast?

11 MR. ROTHMAN: A. I think the first two
12 of those questions fall to me, and the last to Mr.
13 Burke or Dr. Buja-Bijunas.

14 As far as I know, there is no impact on
15 the measured GDP of whether people work one or two
16 jobs. GDP attempts to include all the value-added in
17 the economy, the entire output of goods and services.
18 So, if one person works two jobs, it simply means that
19 that person contributes more to the measured output of
20 goods and services in the economy and doesn't create
21 any particular problem or bias for the aggregate GDP
22 accounting.

23 Where there might be some effect on the
24 GDP would come if one of those two jobs were
25 an-under-the-table or black-economy second job. If one

1 of those were not recorded, usually for purposes of
2 evading tax, but sometimes for other reasons, if one of
3 those jobs were not recorded, then that would, of
4 course, not get recorded in the GDP, and it would tend
5 to bias the GDP downward.

6 But I have no evidence, and I don't know
7 that there is evidence, to suggest that it is more
8 likely that someone working two jobs would have a job
9 in which income isn't recorded than the person working
10 one job would have income that isn't recorded.

11 Q. It's just that my concern was based
12 on the fact that the GDP would go up, but the
13 electrical usage wouldn't go up, because you would
14 still be living in the same apartment or house, and you
15 are --

16 A. Let me answer your questions, and
17 then Mr. Burke will get to that, and perhaps deal with
18 it then.

19 I don't see any way that people having
20 two jobs will somehow distort GDP calculations as they
21 exist now.

22 The second question was, is this a
23 temporary or permanent phenomenon? For me, I would
24 guess that the impetus towards working more than one
25 job is a function of relatively slow productivity

1 growth. So that if people want to have their standards
2 of living continue to rise, they need to have another
3 job, because their productivity in their first job
4 isn't rising fast, and so their incomes aren't rising
5 fast. That's another of the reasons, I think, that the
6 impetus towards two-income families: lack of
7 productivity growth has produced a lack of real wage
8 growth over a fairly extended period of time, and that
9 produces some impetus towards having a second income in
10 the family to keep the family's standard of living
11 increasing.

12 Our forecast is that productivity growth
13 will resume at somewhat stronger rates in the '90s, and
14 so, if my hypothesis is correct about one of the
15 factors promoting people taking two jobs, then I would
16 expect to see it less important in the '90s than it has
17 been in the '80s.

18 Of course, I have tried not to be a
19 two-handed economist in these hearings, but on the
20 other hand, we are expecting some relative labour
21 shortages in the '90s, and so that could promote people
22 taking two jobs, because there will be lots of them
23 available, and there will be need for additional
24 workers.

25 I really don't know, but I don't think

1 it's of much importance directly to the forecast,
2 except insofar as it influences the aggregate labour
3 force and the aggregate level of person-power
4 availabilty, worker availability. If there were a
5 significant change in that pattern, it might change the
6 measured labour force participation rates, and that
7 could have some impact on the total measured labour
8 force and, therefore, on measured GDP. We are not
9 anticipating such a change, so we don't see that as
10 causing a change in the forecast of GDP.

11 I think Mr. Burke could now comment on
12 the impact on load forecast.

13 MR. BURKE: A. I will just briefly say,
14 it doesn't really matter, from the point of view of the
15 way you look at electricity demand, whether the income
16 that is earned comes from two jobs or one job. If
17 income is higher, there is a tendency to consume more
18 electricity in the residential sector. It may not be
19 directly proportional to income, but, effectively, with
20 higher income, one may live in larger accommodation,
21 buy larger appliances, whatever, more appliances. It
22 really is not a function of how the income is earned.

23 Q. Now, I guess I am a two-handed
24 economist because my next question is sort of the other
25 side of that, where electricity use might rise

1 disproportionately to GDP. I don't think the street I
2 live on is much different from any other neighborhood,
3 in that many households appear to be subdividing for
4 various reasons, and, with the exception of real estate
5 fees and legal fees, there doesn't appear to be an
6 increase in GDP. The income is the same GDP as
7 produced by people in two households rather than one.

8 Just as a sort of summary, the small
9 village I live in doesn't appear to have any more
10 population than did it five years ago, but there are
11 more families living in two houses instead of one. And
12 to my way of thinking, the GDP might not be increasing
13 for the village, but electricity use per unit of GDP
14 might be increasing.

15 As in the question above, is this skewing
16 the GDP? I will skip a second question as to whether
17 it's a permanent or temporary phenomenon, and I will go
18 to the third question, what, if anything, would be the
19 effect on electricity use?

20 MR. ROTHMAN: A. It doesn't skew the
21 GDP. Again, it all gets measured, but it would
22 increase the housing activity relative to the total
23 population. That is, rental value of rental
24 accommodation and an imputed rental value of
25 owner-occupied accomodation are both included in the

1 GDP. So, if you have the same number of people
2 occupying more housing, then that would increase the
3 measured GDP, because it would increase the measured
4 amount of housing available. And measured housing
5 services provided is really what we are measuring.

6 MR. BURKE: A. Well, I thought Mr.
7 Rothman would add something about our forecast of
8 households.

9 MR. ROTHMAN: A. I thought you were
10 going to.

11 MR. BURKE: A. Maybe Dr. Buja-Bijunas
12 has the details.

13 Q. I think that the answer to the first
14 question was adequate enough for my purposes, unless
15 there is something startling.

16 A. Effectively, residential demand is
17 not just determined by income, it's determined by the
18 number of households. We do a forecast per household,
19 and so we have to take into account the fact that there
20 may be -- I am not sure that we are forecasting...

21 Just confirming here. We have a forecast
22 which I think captures a little bit of your trend, but
23 there are factors such as aging of the population which
24 tends to increase the number of households in the sense
25 that families sort of reach a stage where they set up

1 their own households, and older people may perhaps move
2 into separate accommodation and so on. There is a
3 trend toward decreasing number of people per household.

4 So that we have a demographic forecast
5 and with that decreasing number of people per
6 household, we actually have a tendency to more
7 households for the total population, for a given
8 population in the future, than we have today, and I
9 think today more so than ten years ago.

10 So that, I think the trend you are
11 spotting, which occurs for a variety of reasons, is one
12 which we are picking up in the forecast and comes
13 through in the treatment of the number of households,
14 rather than the treatment of the income as such.

15 Q. Now, just to summarize what we have
16 been trying to learn here for the last few weeks, for
17 my own limited understanding, would it be safe to say
18 that the analytical tools and abilities of forecasters
19 have increased in sophistication over the last decade,
20 so that the uncertainty bands would tend to narrow
21 somewhat?

22 A. Well, I guess one of the things I
23 have been trying to say is that the uncertainty we are
24 trying to measure is not a function of how you
25 forecast; it's a property of the economy, of the things

1 [10:25 a.m.] Q. I guess what I am saying is that we
2 can forecast things better because of better tools and
3 better abilities.

4 A. Well, there are no guarantees.

5 Q. I realize that.

6 A. That is the intent, yes, and we think
7 we have come a long way in the last ten years.

8 Q. And yesterday, Mr. Burke, I believe
9 you said, if I heard you right, one of the real
10 difficulties of forecasting was to assign weights and
11 probabilities to low probability yet high impact
12 situations. Is that a reasonable...?

13 A. Certainly that's a fair statement.

14 Q. And just to get you on the same level
15 I am. In agriculture, we sometimes tended to call them
16 unexpected fundamental occurrences or UFOs, something
17 that just sort of zings in out of nowhere and wipes
18 everything out, like trade embargoes, droughts, and
19 that sort of stuff. So we in agriculture have been
20 dealing with this for a pretty long time.

21 As an example, just so that I can put it
22 in maybe a non-agricultural format, if we were sitting
23 here a year ago, would you, in general terms, say that,
24 for example, the election of an NDP government in
25 Ontario could be an example of the low probability, yet

1 potentially high impact, scenario? Again, in general
2 terms, this is just a...

3 ---Discussion off the record.

4 MR. THOMPSON: I am not going to proceed
5 any further on that question. I just want to --

6 MR. B. CAMPBELL: This is where the sign,
7 "The buck stops here," moves down the table a little
8 bit. (Laughter)

9 MR. THOMPSON: I won't be using this in
10 my final argument either, by the way.

11 MR. ROTHMAN: Yes. But someone else
12 might.

13 I wouldn't consider the election of an
14 Ontario government as a low probability/high impact
15 event, without commenting on its probability.

16 I think that while, as I have said
17 repeatedly throughout the hearing, I think, government
18 policies can influence the direction of an economy, and
19 especially policies at either the provincial or the
20 federal level can influence levels of investment, can
21 influence productivity in various ways, we don't, at
22 this point, see the election of the New Democratic
23 Government as likely to produce policy changes of a
24 kind that would take us away from the general pattern
25 that our forecast has.

1 And we are not -- well, we are currently
2 in the process of doing a long-term forecast, and we
3 are considering what impact that changing government
4 would have on our long-term forecast, and I don't know
5 that we have come to firm conclusions yet, but I don't
6 see it as the kind of very high impact event that I
7 think we have been talking about.

8 MR. THOMPSON: Q. It may have been sort
9 of a poor example, in that it was sort of a late night
10 thing that I wrote down last night. But, you have been
11 talking about some of the, just on your last comment,
12 about the low probabilities that...

13 Do you take an account in your forecast
14 for the things that have no probability of happening?
15 Like, we have been trying, in this probability
16 distribution function, to assign a low percentage value
17 to something that, my experience where I come from, has
18 been that it's the things with zero probability that
19 happen. The things with low probability almost never
20 do.

21 Is there something in your forecast, or
22 do you sit there in the back of your mind saying,
23 something is going to happen? I don't know what or
24 where or when. But can I be really confident in my
25 confidence limits knowing that with my years of

1 experience as a forecaster, that something is going to
2 happen out of the blue that might skew this one way or
3 the other?

4 Mr. Burke was saying yesterday that
5 something which has almost no probability of happening
6 now might end up being the major driver in the year
7 2015. Is there any implicit adjustment in your
8 forecast to include some of these things that I would
9 call "zero probability events"?

10 MR. ROTHMAN: A. Well, I think what you
11 are calling zero probability events, I would call low
12 probability events. I assign a zero probability to
13 almost nothing. At the risk of absurdity, I don't
14 assign a zero probability to extra-terrestrial beings
15 appearing over earth and insisting that we stop doing
16 what we are doing, or do something else, or something
17 like that. That is not a zero probability. I think
18 it's a very low probability, but it's not a zero. So,
19 I wouldn't assign zero probability to almost anything.

20 I think we can look at events of the kind
21 that you have talked about in the world, and say we
22 would have put fairly low probabilities, for example,
23 two years ago, on the kind of events in Eastern Europe
24 that are now occurring. And we have said that they
25 have some impact on our forecasts in the sense of

1 raising real interest rates over the medium term,
2 because of the capital that will be needed to rebuild,
3 at least, some parts of Eastern Europe, which will come
4 from Western sources. And that's one that we wouldn't
5 have put into a forecast.

6 On the other hand, although we would have
7 said Iraq's invading Kuwait was a low probability
8 event, we had implicitly had in our forecast -- we have
9 stated repeatedly in our energy price forecasts, that
10 we don't expect energy prices to move smoothly; that we
11 do expect crises of various kinds to occur in the
12 Middle East, because that's an unstable area. And we
13 don't know exactly which crisis is going to occur, but
14 I have to say that a crisis of the kind that did occur
15 wasn't a big surprise.

16 So, where we can make some judgment that
17 there are some unspecified but reasonably likely
18 events, we try to incorporate those in the forecast.
19 Where we don't have that kind of ability to specify the
20 nature of the unlikely event or the nature of events
21 that are individually unlikely but cumulatively likely,
22 then we haven't been able to include those in the
23 forecast.

24 Q. I have just one last question. Now,
25 I have been told, or I have some belief in the theory,

1 that the incidence of what I call these UFO or low
2 probability events that happen, that the incidence of
3 these occurring has been increasing, or will likely
4 increase. And the magnitude of the effects of these
5 UFOs will likely affect -- or have been increasing to
6 the point that these uncertainties would tend to
7 increase your uncertainty or your ability to predict,
8 in some way offsetting your technical ability.

9 So on the one hand, you have your tools
10 and your intelligence tending to make the better
11 forecast; and on the other hand, you might have these
12 UFOs, as I call them, tending to increase the inability
13 to forecast. So is it fair to say there is sort of a
14 trade-off in that area?

15 A. I am not sure that I agree that the
16 likelihood of unlikely events has somehow increased. I
17 think it's important to emphasize Mr. Burke's point
18 about the load forecast uncertainty band. That band
19 intends to estimate uncertainty in the load forecast
20 itself -- sorry, in the load itself, not in the load
21 forecast.

22 That is, what we are trying to do is to
23 model the uncertainty of load, not to model how well we
24 do or don't forecast it. And so the load forecast
25 uncertainty band's validity doesn't depend on our

1 ability to forecast or not to forecast.

2 The question, though, the question that
3 you keep getting back to is that of how does that
4 account for, how does that relate to these low
5 probability/high impact events? The answer is that the
6 load forecast uncertainty -- sorry, I keep saying that
7 and Mr. Burke keeps correcting me every time I do talk
8 about that. That the load uncertainty does not
9 account -- the load uncertainty we have estimated does
10 not account for those events, and so they lie outside
11 the band.

12 I am not sure how well I have answered
13 that question. I am not sure that I see the trade-off
14 that you are trying to make.

15 Q. It's a theory that we can do things
16 better, but the better we can do things, the more
17 uncertainty we seem to discover.

18 MR. BURKE: A. Maybe I could just add
19 that if we observed over a large number of years what
20 you are saying was true, then the load data itself
21 would be more variable, the GDP data itself would be
22 more variable, and the relationship between load and
23 GDP would become less certain; that is, the
24 coefficients in these equations would no longer
25 estimate as tightly, so that the standard errors of

1 their estimates would start to increase, showing that
2 the relationships weren't as clear anymore. Things
3 were happening that you just couldn't explain using the
4 simple model of GDP to load that we are using.

5 And, effectively, what that would do is
6 widen the band. But the nature of this sort of
7 exercise, it would take ten or twenty years of that
8 sort of expansion and uncertainty and, effectively,
9 erosion of the sorts of relationships we currently are
10 working with to show up in wider bands

11 And in that sense there is sort of an
12 averaging process that you really have to demonstrate
13 this increased sort of randomness or something that you
14 are talking about in the way the world works over a
15 significant period of time to really be able to measure
16 it and project it.

17 Q. Thank you very much.

18 Well, if the panel had had one-word
19 answers, we would have taken five minutes, Mr.
20 Chairman. I apologize for being slightly --

21 MR. B. CAMPBELL: With those questions,
22 you want one-word answers? Please. (Laughter)

23 MR. THOMPSON: Thank you very much.

24 THE CHAIRMAN: Ms. Kleer.

25 MS. KLEER: Good morning.

1 I think I will begin by just distributing
2 the materials that I will be referring to.

3 THE CHAIRMAN: Perhaps you could just
4 confirm on whose behalf you are asking the questions.

5 MS. KLEER: I am going to be asking
6 questions on behalf of Nan/Treaty #3/Teme-Augama
7 Anishnabai, but also on behalf of Moose River/James Bay
8 Coalition. And what I will try and do is indicate for
9 each section which party I am asking these questions on
10 behalf of.

11 THE CHAIRMAN: I don't know whether
12 you -- well, you can. I've got no objection to doing
13 that, but I don't think you need to necessarily do
14 that. It's up to you.

15 MS. KLEER: All right.

16 The set of interrogatories has two parts
17 to it. There is a single sheet and then a large number
18 of sheets.

19 CROSS-EXAMINATION BY MS. KLEER:

20 Q. Mr. Rothman, I think I will start
21 with you. I am going to first begin in the area of
22 peak forecasting methodologies, so I believe these
23 questions should go to you.

24 If we can look first to Interrogatory
25 1.10.30, which is at the top of the package I gave to

1 the Board, it's a simple point. Would you agree with
2 me that your end-use models do not produce peak
3 forecasts; they only produce energy forecasts; is that
4 correct?

5 MR. ROTHMAN: A. That is correct.

6 Q. And if I understand you correctly,
7 you have said, in you cross-examination by the
8 Municipal Electrical Association, that the experience
9 of the load factor over the last twenty years did not
10 reveal a clear trend. So, you have chosen load factor
11 as a constant out from 1995. Is that correct?

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1 [10:40 a.m.] A. That's really Mr. Burke's area.

2 MR. BURKE: A. Yes, that's correct.

3 Q. I just want to understand for the
4 basis of this discussion what your methodology is. You
5 take the load factor that's derived from your last year
6 of your short-term forecast, and then you forecast that
7 out as a constant over the next twenty years to the end
8 of the period?

9 A. That's correct.

10 Q. So, in essence, you are treating peak
11 as a function of energy?

12 A. Well, peak is derived from energy
13 using a constant load factor, yes.

14 Q. And, again, just to understand, as
15 load factor goes up, peak falls relative to energy and
16 vice versa, as load factor goes down, peak rises
17 relative to energy?

18 A. I think you understand the thing
19 correctly, but I would have put it slightly
20 differently. That is, that a higher load factor for a
21 given energy will result in a lower peak. In other
22 words, if you keep energy constant, you ask what
23 happens with a high load factor, you get a lower peak.
24 If you have a lower load factor, you get a higher peak.

25 Q. That is fine. Now, you would agree

1 that between your '89 and 1990 load forecasts, the load
2 factor decreased by 0.3 per cent? That's at page 3 of
3 your 1990 load forecast. Do you recall that figure?

4 A. Yes, I do. I would want to check if
5 that was for the primary or the basic.

6 Q. It is at page 3 of the 1990 load
7 forecast, which is Exhibit 9, the basic load forecast.

8 A. Basic, fine, thank you. Yes.

9 Q. You have been quite explicit, have
10 you not, in stating that you are pretty unclear about
11 what the relationship is between peak and energy; am I
12 correct in understanding that?

13 A. Well, I would be quite explicit as to
14 what I think it is. It's a constant relationship and
15 it varies in a fairly narrow range, but historically,
16 fairly unpredictably; that is, it ranges between about
17 62 and 70 per cent but fairly randomly, so we have
18 essentially said it's effectively constant for the
19 long-term forecast.

20 Q. But you take it out from the fifth
21 year, you don't take it out from the first year?

22 A. Yes. We use information about
23 individual customers' load factors in the short-term
24 load forecast to derive the load for factors for each
25 of the first five years of the forecast; that is, in

1 the short-term forecast. I have described that
2 process. It involves doing straightforward trend
3 analysis, various techniques are applied, simple time
4 trend or exponential smoothing, and so on, to each and
5 every customer. And for each of those customers, we
6 have quite a long history of load factor information by
7 month. That data is analyzed and can lead to a change
8 in the load factor on an annual basis for several
9 reasons, either that there is a trend in the load
10 factor of a particular customer, and sometimes those
11 changes may be not simply a result of a trend. It
12 could be that an industry is making a discrete change
13 in its production process and we are made aware of that
14 and we take that into account.

15 So that we have changes at the individual
16 customer level. Then, over five years, there may be a
17 change in the mix of customers. Industry tends to have
18 a high load factor; residential, a low load factor. If
19 that mix changes, that will alter the aggregate load
20 factor slightly. And that's why it is possible that
21 over the five years of the short-term forecast, the
22 aggregate load factor for the system evolves somewhat,
23 as, in fact, it does, as you can see in the information
24 you have provided.

25 Q. Well, let's turn to Interrogatory

1 1.10.29. It seems to me if you go to the fifth
2 paragraph there, it says: Variable elasticity and
3 linear relationships have been estimated for different
4 sample periods. Despite this effort, no firm
5 conclusions have been reached up to now because -- and
6 then you give a number of reasons. And then you go on
7 to say: When these equations -- that's the one that we
8 are looking at, at the top the page; is that correct?

9 A. No, I think it is the variable
10 elasticity and linear relationships referred to at the
11 beginning of that paragraph.

12 Q. Okay. When those equations, then,
13 are used to produce a forecast of annual system peak,
14 the results show a load factor which increases slightly
15 over time, and the range of this increase is of the
16 order of 1 to 2 percentage points. And then, the
17 results from the customer survey imply a slightly
18 declining load factor in the short-term. Therefore,
19 given that further work is required on the empirical
20 side, it is felt than an assumption of constant
21 long-term load factor is reasonable at this time.

22 If we just look at that last sentence
23 there, given that further work is required on the
24 empirical side, to me that answer seems slightly
25 different than what you are saying now, which is that

1 the load factor varies around a constant mean. I am
2 not sure that we are talking about the same things
3 here.

4 A. Well, I think the first point, where
5 it says the equation is sensitive to the period chosen
6 for estimation. Depending on the time period, you can
7 get results that indicate an increasing load factor, or
8 if you chose a shorter time period, you can get one
9 that's pretty will stable.

10 As we said, we would much prefer to
11 estimate the relationship between peak and energy with
12 weather-corrected information. That might account for
13 some of the -- it might change the relationship if we
14 were doing it that way.

15 After all, weather for a year -- if we
16 just use raw data for energy and raw data for peak,
17 certainly the weather effects that determine the one
18 hour of December peak or January peak are unlikely to
19 be related to the average weather for the year. So,
20 using weather-corrected information in each case could
21 give quite a different result.

22 While we do have the weather-corrected
23 energy values, we did not have - at the time we were
24 putting the forecast together for 1990, and we still
25 don't have - weather-corrected peak data.

1 So, I guess I am suggesting that, yes,
2 there is some uncertainty about the precise estimate.
3 We have effectively sawed off at the constant value
4 given to slightly diverging trends; that is, the
5 short-term results tend to be coming down for the load
6 factor. The models, to the extent that they perhaps
7 are estimated over longer time periods, say, from early
8 '60s through to the late '80s, show slightly increasing
9 load factor.

10 Unfortunately, we are not in a position
11 to make a definitive statement; that is, I don't have a
12 pure analytical solution for what the relationship
13 between peak and energy should be. Effectively, this
14 is a case where we have got several pieces of
15 information and we are making a judgment call at this
16 stage. But I also wanted to indicate in this response
17 that, were we to be off, in talking about a constant
18 load factor, we probably are only off by one or two per
19 cent.

20 Q. But one or two per cent difference in
21 a load factor translates into a fairly large difference
22 in peak; isn't that correct?

23 A. That is correct. But relative to 20
24 or 25 per cent uncertainty band around the peak, 25
25 years from now, you know, I think it is not a major --

1 should not be a major element in determining the
2 results of the planning process.

3 Q. Do you have any explanation as to why
4 your customer surveys would tend to show load factor
5 decreasing in the short-term? Have you analyzed that?

6 A. Actually, it's not something that the
7 survey is indicating. We have the history of the
8 customers for the last 15, 20 years by month, and it's
9 the analysis of the history of each individual
10 customer's load factor that is projecting through the
11 next five years and producing the results that are
12 here.

13 It, in fact, is the case that, if you look
14 at, say, a 10-year moving average of load factor, that,
15 historically, the 10-year moving out to load factor is
16 much closer to the values that we get in 1995 than the
17 values that we seem to be having right now. So, there
18 is essentially a smoothing going on, an averaging down
19 from recent data that is coming out in the forecast at
20 the customer level. Let me see if I can turn up what
21 the 10-year value is.

22 The 10-year moving average for load
23 factor in 1989 was 66.5, which is lower than the value
24 we actually observed in 1989 itself. So part of the
25 issue is we may be starting from a period in time with

1 unusually high load factors. For instance, if there a
2 combination of -- these are all in raw data, these load
3 factors that we are looking at.

4 Q. What do you mean raw data?

5 A. Not weather-corrected.

6 Q. Well, we will get to that, but one of
7 them is, the '89 figure is weather-corrected.

8 A. The 1989 is weather-corrected, okay.

9 Well, then, I won't make an explanation
10 for why 1989's data might have had a higher load factor
11 just for weather reasons. But it's quite conceivable,
12 in years, for instance, where you have hot summers,
13 that tends to produce a lot of air-conditioning energy
14 load, but happen to have fairly mild winter as well, so
15 the peak isn't very high in the winter, that looks like
16 a high load factor in the short-term, and is a
17 combination of weather effects, which is not our
18 long-term normal average that we use for forecasting.

19 So, I think it is important to average
20 out over time and not just look at the start year's
21 load factor, and say, well, golly, it should be at
22 least as high as it was in the start year. And I think
23 that's what the customer forecasting system does, it
24 looks at the customer's load factors over time and
25 trends them. And then looks at the changing mix and

1 gets to a point in 1995, which probably is not very
2 sensitive anymore to weather or economic cycles or
3 anything, and I think is, therefore, a good
4 starting-off point for the long-term load forecast.

5 Q. Would you say that you have placed
6 greater reliance on your customer survey history
7 analysis than do you on your model outputs, which tend
8 to show an increasing load factor?

9 A. For the short-term we rely totally on
10 the customer system. And for the long-term, we have
11 essentially kept it constant, for a variety of reasons
12 that we have been discussing.

13 Q. So you are saying for the short-term
14 term, you rely on your customer surveys?

15 A. Yes.

16 Q. And then the rest of it is your model
17 output?

18 A. Consideration of the model output,
19 consideration of other trends, consideration of the
20 most recent history, as opposed to the longer time
21 periods which tend to show that increasing load factor.

22 Q. Well, isn't it true that your
23 customers' short-term estimates tend to over-estimate
24 for peak? ...

1 [10:55 a.m.] A. As I suggested, it isn't a question
2 of what they are forecasting; it's an analysis of the
3 history of what they have actually consumed, what their
4 peak and energy has been.

5 Q. I am just trying to understand this,
6 because my understanding of it, at least before today,
7 was that you, in fact, took your customer survey
8 results, their own estimates, and used them, but you
9 are saying that you do a historical analysis.

10 A. I think, in one of the
11 interrogatories you asked, I think we gave you, I
12 believe, a process description of what the customer
13 load forecast was. If not, I can certainly refer you
14 to an interrogatory that did.

15 The customers provide us with their peak
16 forecasts, interestingly enough, and we have to
17 estimate the load forecast from historical data in
18 order to convert that into energy, so we're actually
19 going the opposite direction with the customer data.
20 But they don't provide us with both.

21 Q. I am just trying to pose another
22 possible way in which you might do your peak
23 forecasting and just have you comment upon that. Would
24 it be possible to forecast for peak, taking your
25 customers' peak estimates and your energy estimates

1 that you get from your customer peak results, given
2 that they don't themselves estimate peak -- sorry,
3 estimate energy; they only estimate peak. And then
4 from that, derive a load factor. Is that one way that
5 you might get to your load factor?

6 A. That's exactly in a sense what we are
7 doing, but the way we get the energy is by having
8 derived the load factor; that is, we have to use the
9 history at the customer level to derive a reasonable
10 estimate of that customer's load factor. Once we have
11 got that, the problem is solved effectively. We don't
12 need to do it a second time.

13 Q. I would like to now just try and
14 analyze, and get you to talk about, the trends in load
15 factor that we see here on this exhibit. Perhaps we
16 should give this page an exhibit number.

17 THE CHAIRMAN: All right. What number is
18 that, please?

19 THE REGISTRAR: That will be number 131,
20 Mr. Chairman.

21 MS. KLEER: And for the record, that's a
22 page entitled, "Load factors from 1990, 1989, and 1988
23 Load Forecasts."

24 ---EXHIBIT NO. 131: Page entitled, "Load factors from
25 1990, 1989, and 1988 Load
 Forecasts."

1 MS. KLEER: Just to explain how this
2 table was put together: You see there the page
3 references from each of the forecasts for the years
4 1990, 1989 and 1988 from which peak and energy figures
5 are taken. And then, the load factor is a calculated
6 number, calculated using the equation that is at the
7 bottom of the page, which equation was also given in
8 Interrogatory 1.10.29.

9 Q. Now on page 40 of your load forecast
10 for 1990, which is Exhibit 9, if we can turn to that?

11 MR. BURKE: A. We have had some
12 differences in numbering. Could you say what's on that
13 page, please?

14 Q. That page has written on it,"Air
15 conditioning and lighting," in the fourth and fifth
16 paragraphs. I believe these questions may go to Dr.
17 Buja-Bijunas, so I will ask them.

18 I believe it is stated here that air
19 conditioning will continue to be installed in more and
20 more buildings, both new and retrofits; is that
21 correct?

22 DR. BUJA-BIJUNAS: A. That's correct.

23 Q. And if we can turn, then, to response
24 1.10.56, which should be the next one in the Board's
25 package, the answer there is that office space is

1 growing at 2 per cent, which is two times the average
2 for the commercial sector in general; is that correct?

3 A. That's correct, yes.

4 Q. And in that same response, I believe
5 you have predicted that higher saturation of electric
6 office equipment and air-conditioning is expected to
7 occur over the period in the forecast?

8 A. That's correct, yes.

9 Q. And, then, in response to
10 Interrogatory 1.10.59, which I apologize for the copy
11 quality. It was a light copy that I got, so you got an
12 even lighter copy. I can get you another copy for the
13 record.

14 In that interrogatory response, you have
15 indicated that you believe there is a trend towards
16 longer operating hours, improved ventilation in the
17 commercial sector; is that correct?

18 A. That's correct, yes.

19 Q. And in that same response, you
20 indicate that Ontario Hydro predicts that there will be
21 more office hours per year and therefore increased
22 activity.

23 A. Activity. Longer office hours,
24 because of flexible hours and extended workday and,
25 therefore, various services would be left on for a

1 longer period, and therefore increase electricity use;
2 yes.

3 Q. Okay. That's what you mean by
4 increased activity?

5 A. Yes.

6 Q. All right.

7 The same answer again: Increased
8 saturation of electricity-using equipment in the
9 multi-unit residential and office segments of the
10 commercial sector is predicted?

11 A. That's right.

12 Q. And does this equipment tend to be
13 operated much of the hours that offices are open? Is
14 that how it works?

15 A. Could you repeat the question,
16 please?

17 Q. Does the equipment tend to be
18 operated much of the hours when offices are open,
19 basically?

20 A. That's correct.

21 Q. And you would agree that electricity
22 demand in commercial and industrial sectors are
23 expected to grow more rapidly throughout the forecast,
24 as compared to residential sector?

25 A. That's right, yes.

1 Q. Would you agree that the load factor
2 for the industrial and commercial sectors is higher
3 than that of the residential sector?

4 A. Correct.

5 Q. Now, all of these things that we have
6 been talking about - increased proportion of commercial
7 and industrial components of load relative to
8 residential, increased air conditioning and
9 ventilation, longer operating hours, increased
10 saturation of electricity-using equipment in the
11 commercial sector - all of those things, would you
12 agree, would tend to increase the load factor? Is that
13 fair?

14 ---Off the record discussion.

15 DR. BUJA-BIJUNAS: One of the
16 considerations regarding peak is, as you mentioned,
17 growing saturation of air-conditioning systems, et
18 cetera. That's a summer issue.

19 I think an area that should be looked at
20 is space heating, as how that would affect peak as
21 opposed to air-conditioning. All the factors you have
22 mentioned are quite true, but they don't necessarily
23 have as direct impact on peak as space heating would.

24 MS. KLEER: Q. Well, then, perhaps you
25 should tell me what impact space heating would have on

1 load factor?

2 DR. BUJA-BIJUNAS: A. As you mentioned,
3 a number of the factors such as saturation and
4 utilization, et cetera, for the various sectors, are
5 year-round issues. They are used throughout the year,
6 not preferentially during the wintertime; whereas,
7 space heating and increase in saturation and that
8 particular area would have more an effect on peak.

9 Q. I am talking about the effect on load
10 factor, though. That's what I am trying to get to.

11 MR. BURKE: A. Maybe just another way of
12 putting what Dr. Buja-Bijunas is saying: You asked a
13 bunch of questions that related to energy consumption
14 and showed that certain trends are intended to increase
15 energy year-round, but we have not yet discussed the
16 relative magnitude of increase in space-heating load in
17 the commercial and residential sectors to the increase
18 in energy, because it is the ratio of these two that
19 really will determine the trend in the load factor.

20 That's not a trivial exercise to know how
21 the energy forecast for space heating translates into
22 trends in peak. I don't know whether Dr. Buja-Bijunas
23 has got that sort of information to work with right
24 now, but, effectively, in order to understand whether
25 we can infer from various of the trends that you are

1 talking about whether the load factor is increasing or
2 decreasing for the system as whole, we have to know
3 whether the space-heating portion, in absolute terms,
4 is growing faster than the air conditioning and so on.

5 Air conditioning may be growing faster,
6 but if space heating is a much larger load in the first
7 place, it can grow more slowly and still have an effect
8 which results in the December peak rising faster than
9 the energy year-round, or offsetting some of these
10 energy effects that you are talking about.

11 It's a fairly complicated analysis, and
12 we said at the beginning that we didn't do a complete
13 end-use treatment of peak. We forecast at this point
14 in time our end-use model in terms of energy and then
15 convert the whole system to peak.

16 Certainly, the sort of line of
17 questioning that you are adopting suggests that it
18 would be a useful thing to be able to do, to look at
19 all of the individual end uses and what their trends
20 are, take their load shapes into account, and then
21 infer what the end-use forecast says about peak. I
22 just don't think we can do it on a piecemeal basis, and
23 it is a direction we are moving.

24 But I think in some of the interrogatory
25 responses, we said that we had devoted our effort to

1 improving the quality of the energy forecast, before we
2 moved on to the second issue, which is peak. And that
3 requires not just a matter of methodology, it requires
4 considerable data on the load factors by end use, load
5 shapes by end use, really. So that data has to be
6 acquired as well.

7 Q. So, just to get it clear then,
8 essentially you focussed your energies on forecasting
9 for energy rather than forecasting for peak, and this
10 is something that you intend to work on in the future:
11 improving your peak forecast?

12 DR. BUJA-BIJUNAS: A. Yes. In fact, one
13 of our models, the COMMEND model for the commercial
14 sector, does allow you to forecast peak. You start off
15 with the energy forecast - that is always the thing you
16 start off with - then you supply it with load shapes.

17 The only consideration is that we haven't
18 a good data base or we haven't put sufficient effort
19 into getting those load shapes, so that we can use both
20 parts of the model, in essence, to then look at peak,
21 but it is the next step. So some of these models do
22 accommodate that.

23 Q. That was going to be a later
24 question.

25 Just to get it clearly then in my mind.

1 Why have you chosen not to do COMMEND? Was this a
2 decision you made internally? Or at least use COMMEND
3 for the purposes of forecasting for peak.

4 A. Okay. Two things. As I said,
5 COMMEND requires you to do your energy forecasting
6 first. And all our efforts to date have been trying to
7 get end-use energy forecasting to a state that we are
8 relatively comfortable with it. So, it is just a
9 pragmatic issue. We have to get that underway first.

10 The next step, then, is to get good load
11 shape data for Ontario. You can use things like U.S.
12 average load shapes, but we would prefer using
13 something that we feel certainly is representative of
14 Ontario, as opposed to something that was generated for
15 the U.S. average. We are then faced with gathering
16 good load shape data and combining that with our
17 previous effort for loads forecasting, then, to get the
18 peak forecasting. So it is an evolution and we are
19 just partway into that evolution.

20 Q. I take it, then, you haven't done the
21 exercise of taking the average load shapes from a U.S.
22 utility?

23 A. We have not done that. We have not
24 done that, that's correct.

25 MR. BURKE: A. I would point out that in

1 gathering this load shape data, you can't just pick and
2 choose some of the interesting sectors. In order to be
3 able to apply it, you have to have a complete set of
4 load shapes.

5 Q. Let's look, then, at this exhibit,
6 which just got a number, Exhibit 131. And I appreciate
7 that I didn't get this to you earlier, so you haven't
8 been able to check the load factor calculations here,
9 but if you can accept for the moment that these are
10 correct. I just want to look and compare forecast
11 years.

12 I have underlined within each forecast
13 year the point at which the load factor levels out.
14 And you would agree with me - again, just accepting the
15 figures - that in 1988, the forecast load factor levels
16 out at 66.82 per cent? Do you agree?

17 A. Yes.

18 Q. And in 1989, it levels out at 66.52
19 per cent?

20 A. Yes.

21 Q. And in 1990, it levels out at 66.34
22 per cent; is that correct?

23 A. Yes.

24 Q. So between the three forecast years,
25 then, you see that your load factor forecast is

1 decreasing as between '88 to '90?

2 A. Yes.

3 Q. Now, it's correct to say, is it not,
4 that when you observe your load factors over time, they
5 are fairly randomly distributed?

6 A. Yes. And I also think that these are
7 very small differences.

8 Q. Well, we'll get to that.

9 You would agree with me, though, that
10 they are decreasing slightly?

11 A. Yes, in these three years, they are.

12 Q. And, then, within each forecast, as
13 well -- if you look at 1990, you see that the load
14 factor decreases from the start of the forecast, 1989,
15 to 1995, and you see the same decrease in load factor
16 for the 1989 forecasts and for the 1988 forecasts. Is
17 that correct?

18 A. Yes.

19 Q. Now, your models show load factor --
20 or not your models, your equations tend to show load
21 factor increasing by 1 to 2 percentage points over
22 time.

23 A. It depends on the period over which
24 you estimate them. I showed a plot in my direct
25 evidence that indicated that after about 1970, there

1 was a very distinctly different trend in the load
2 factor than previously. And the more you include of
3 the period previous to 1971, the more you capture this
4 trend to increasing load factor. But there is no
5 significant time trend between 1971 and 1989 in the
6 load factor.

7 So that I would, to do a long-term
8 forecast, prefer to be comfortable that I had explained
9 the change in the load factor between the '50s, say,
10 and the '70s, and I haven't got a model that
11 particularly does that, that's why I don't feel the
12 analysis is complete at this stage.

13 But, the most recent history is one where
14 there is no time trend. That speaks again to the issue
15 of why, beyond 1995, we felt comfortable with keeping
16 the load factor constant. But what happens in those
17 first five years, I can only say is what the individual
18 analysis of the customers' load factors and mix of
19 customers and so on is indicating.

20 It could very well be, for instance, that
21 the industrial share -- sorry, the industrial and
22 commercial loads are going faster than residential, but
23 within the industrial, the big high load factor
24 customers are decreasing their load factors. Until you
25 you start looking at the details, there is very little

1 you can generalize. And effectively, I have to
2 appreciate or have confidence that, by looking at each
3 and every individual customer, the trends in their load
4 factors and the evolving weights of those customers, I
5 am getting a reasonable estimate.

6 There is someone in the short-term area
7 who looks at each and every customer's load factor in
8 the course of generating this five-year forecast, and
9 it is very difficult to fiddle this some way to get a
10 certain result. It's essentially about 500 customers
11 for which a load factor estimate is prepared.

12 Q. Well, I will just ask one further
13 question on this, then. I mean, aren't you left
14 feeling rather uncomfortable with the fact that your
15 models go one way and your customer surveys tend to go
16 the other way?

17 A. As I have indicated, the models don't
18 go one way, unless I start to include the earlier data.
19 And the change may be one that is related to a rate
20 structure change that occurred between the '50s and the
21 '70s, to do with the demand energy splits. But I
22 haven't been able to model that, so I cannot say for
23 sure. The degree to which load factors are -- I mean
24 we have talked about their volatility, but they are
25 volatile in a narrow range. They are volatile between

about 62 per cent and 70 per cent and they average out
at numbers like $66\frac{1}{2}$, 67.

In the scheme of things, I really do believe that a half a per cent difference in the load factor is just part of this sort of planning uncertainty we have to be able to deal with when we look at the complete uncertainty band on peak, which is roughly plus or minus 20 per cent by the end of the period.

• • •

1 [11:15 a.m.] I am not particularly uncomfortable,
2 because we haven't become extremely precise about the
3 load factor. I think we have got a reasonable
4 estimate. The extent of the error on either side is
5 not going to be more than one, maximum two per cent.
6 Certainly, you could say that translates into a
7 significant number of megawatts, but I don't know which
8 direction it's going, which is why we are happy to keep
9 it constant at this stage.

10 Q. Would it be just as plausible for you
11 to assume that load factor would increase slightly over
12 the long term, as compared to decreasing? Is it just
13 as plausible, given the fact that you don't know fully
14 where the trends are going?

15 A. I think what we are saying is the
16 risks are balanced and until we have done more
17 analysis -- in fact, I think the correct way to resolve
18 this question is to use the end-use models, because
19 it's not just a question of looking at history to get a
20 sense of the load factor. I think it is important how
21 the loads in future are evolving and whether the nature
22 of the way load is evolving in future will affect the
23 load factor in ways that are different from the past.
24 And really, you can only get at that with the end-use
25 by end-use load shave to peak kind of conversion.

1 But, in the interim, I don't think a
2 large risk is entailed here, certainly not relative to
3 the uncertainty bands for peak, and certainly, even
4 against the largest estimate of upward drift, we are
5 not talking about much of a change in load factor.

6 That is, if the things that were
7 occurring prior to 1971 are factors that could be
8 replicated in the future are not related to rate
9 structure changes which will not recur, that sort of
10 thing, then I don't think we are dealing with much of a
11 risk at all here.

12 Q. Let me just stop you there for a
13 second. You are not a position here to talk about the
14 what the impact from a planning perspective would be of
15 changing your load factor slightly so that you get a
16 lower predicted megawattage at the year 2015, you can't
17 tell me that?

18 A. I can calculate what a change in load
19 factor does to peak.

20 Q. But you can't tell me what planning
21 impacts are of that?

22 A. No, I can't tell that you.

23 Q. Maybe we can just do that, just to
24 get it on the record, what calculations we are looking
25 at. Let's take 1989 load factor of 67.88 per cent from

1 the 1990 forecast.

2 A. Sorry, you want to use as your
3 estimate the one-year value, just the last year,
4 whatever it was?

5 Q. Rather than taking the 1995 year,
6 let's take the 1989 year load factor.

7 A. Why not take the average of last ten
8 years?

9 THE CHAIRMAN: Let's take what she wants.
10 I am not sure which one it is, though.

11 MS. KLEER: Q. We are looking at the top
12 group of numbers there. For the 1989 year, in the 1990
13 forecast, the load factor was 67.88 per cent. Now,
14 that's an actual, right?

15 MR. BURKE: A. Yes.

16 Q. Would you agree with me that that's a
17 weather-corrected actual, if you go to page 18 of the
18 1990 forecast?

19 A. The numbers look familiar as
20 weather-corrected numbers.

21 I was just reacting to the fact that you
22 would feel better taking a one-year observation as the
23 basis of the 25-year trend than anything else.

24 Q. Okay. If you take the 67.88 per
25 cent, and you hold that constant out to the year 2015,

1 would you agree with me that the calculations would
2 show that you get a peak megawatt decrease from the
3 forecast of 991, which is what is shown in the little
4 square to the right there, if you can just...

5 A. I think, perhaps, what I should do,
6 rather than check all the numbers here, is accept them
7 and come back, if I have a problem with that.

8 Q. That is fine. Likewise, if you could
9 do the check, if you take the 1989 forecast figures and
10 take is the 1989 weather-corrected load factor of
11 67.88, just check whether or not the peak megawatt
12 decrease would be 880.

13 A. Sorry, what is the load factor that
14 you are using in the '89?

15 Q. 67.88 per cent, the actual 1989
16 weather-corrected load factor. I am taking the figure
17 from the 1990 forecast block up there of 67.88.

18 A. And you are applying to what we would
19 have gotten?

20 Q. In 1989 forecast, if you had used
21 that.

22 A. I see. I see. Why would you want
23 to -- I shouldn't ask.

24 Q. Also, just to confirm, I have also
25 included it, if you add in the reserve margin of 24 per

1 cent. If you could just check the numbers there.

2 Again, just to give a point of reference
3 as to why I am putting these numbers forward, if you
4 can turn with me briefly to page 19-4 of the DSP? What
5 I am getting at here is the total number of megawatts
6 that are expected to be obtained from developing the
7 hydraulic facilities in the Moose River Basin; it's
8 just a matter of adding them up.

9 If you add up the developments that are
10 in the Moose River Basin, for which approval is sought,
11 those are Kipling, Smokey Falls, Harmon, Little Long,
12 Abitibi Canyon, Otter Rapids and Nine Mile Rapids, if
13 you add all those up, if you could just check it,
14 whether or not that adds up to 1,311 megawatts.

15 MS. PATTERSON: What is that figure,
16 again?

17 MS. KLEER: 1,311 megawatts. I think I
18 have it right. I did it with pencil and paper, I
19 always do.

20 THE CHAIRMAN: Again, perhaps you would
21 accept the figure, and if turns out to be wrong, you
22 could come back.

23 MS. KLEER: Q. You would agree with me,
24 as a very general proposition, that a relatively small
25 change in load factor translates into what could be

1 perceived from the system planning point of view as a
2 fairly large change in megawatts?

3 MR. BURKE: A. At the median, there is
4 an absolute change which, you know, is probably of the
5 order that you have calculated and so on. But,
6 effectively, people are not planning to a point
7 forecast. I will leave that to the planners to
8 describe. But we are encouraging use of the entire
9 distribution.

10 Q. Just one final question. Do you know
11 when you expect to use your COMMEND model, and I
12 presume your other end-use models, to produce an
13 end-use model forecast result for peak? Is there any
14 sense of timing that you have on that?

15 DR. BUJA-BIJUNAS: A. I think it would
16 be realistic if we used something in the order of two
17 to three years as an estimate.

18 Q. And then, one final question. Are
19 you aware that the New England Power Pool is currently
20 using end-use models to predict peak, to forecast peak?

21 A. I don't think they are using COMMEND.
22 I think you mean CDEMS. I am not sure if they are
23 using the same end-use package. But I do note that
24 there are some utilities that are using end-use
25 forecasting to do peak forecasting. How good their

1 current forecasting capability for peak is, using an
2 end-use approach, I don't know if they are satisfied
3 with it.

4 Q. All right. Well, that's the end of
5 my questions on peak modelling methodology. I would
6 like to turn briefly to the commercial forecast.

7 THE CHAIRMAN: Would this be a good time
8 to take the break, then?

9 MS. KLEER: That would be fine.

10 THE REGISTRAR: This hearing will recess
11 15 minutes.

12 ---Recess at 11:27 a.m.

13 ---On resuming at 11:45 a.m.

14 THE REGISTRAR: This hearing is again in
15 session. Please be seated.

16 MS. KLEER: Q. Mr. Burke, perhaps we can
17 go back to Exhibit 131 and check over those numbers.

18 MR. BURKE: A. Just right there. Just a
19 second.

20 They seem fine.

21 Q. All right. Just one further question
22 that did occur to me. You have talked about this 1 per
23 cent to 2 per cent difference in load factor as being a
24 relatively small change in light of the bandwidth, is
25 that...

1 A. Yes.

2 Q. Well, you would agree with me,
3 though, that that is an additional uncertainty, in
4 addition to all the other uncertainties, so that change
5 would add to, would be an additive uncertainty, to what
6 is already in your bandwidth?

7 A. Well, the bandwidth, essentially,
8 applied to peak -- sorry, applies to peak the
9 equivalent proportionate uncertainty that we got for
10 energy.

11 Strictly speaking, as I indicated
12 yesterday, when we take the load factor distribution,
13 times the energy distribution, we actually get a band
14 for peak that is narrower than for energy. And that
15 band already takes into account the uncertainty in the
16 load factor.

17 So, I think that the uncertainty band for
18 peak is quite adequate to include any of the
19 uncertainties associated with the issue of the sort of
20 calculations of load factor and possible shifts or
21 trends in load factor.

22 Q. Turning to the commercial forecast.
23 If we can just turn up Exhibit 100 just for a brief
24 refresher of what I am going to talk about, and turn to
25 page 24 of that exhibit. This is the page that

1 describes the different results that you get with your
2 end-use and EEMO models for your commercial sector
3 forecast.

4 Do you have that, Mr. Burke?

5 A. Yes, I do.

6 Q. Now, if you look here at the graph of
7 the EEMO and COMMEND model results, you have adjusted,
8 as I understand it, the basic load forecast up 5
9 terawatthours from the 90 terawatthours that is
10 forecast by your end-use model; is that correct? I
11 think that was your evidence, it isn't shown here.

12 A. Yes.

13 Q. And that's one-fifth of the way
14 between what you get with EEMO and what you get with
15 your end-use results?

16 A. The difference was 25 terawatthours.

17 Q. So that is one-fifth, then.

18 Now, I went back to some of your
19 responses to questions by the Municipal Electrical
20 Association about why the EEMO model overestimates for
21 commercial consumption, and I would like to refer back
22 to the April 30 transcript, and that's Volume 6?

23 A. Where on Volume 6?

24 Q. Page 988, starting there. The
25 question actually starts on page 987. The question

1 was:

2 "Is that simply, then, a comparison of
3 the projection of EEMO with your end-use,
4 and you simply say that your end-use
5 results should dominate in your analysis?
6 Is it as simple as that?"

7 Your answer was:

8 "No, it is not as simple as that. It
9 is not because they are end-use that they
10 should dominate. It is because of the
11 various growth rates by end-use that we
12 have modelled explicitly, and the
13 expected growth rates for the "other"
14 category and so on, that we do not
15 believe that a much higher forecast than
16 the one which we have modelled on an
17 end-use basis is appropriate."

18 Then, you go on to say, at page 989, at

19 line 3:

20 "It's also well recognized, I think,
21 that it is in the commercial sector that
22 we expect, in our efficiency improvement
23 programs, to see the greatest efficiency
24 gains."

25 And then, going on further on that page,

1 page 989, at line 21:

2 "So that, if anything, one would have
3 expected the commercial sector to have
4 perhaps more moderate rates of growth
5 than those implied by the econometric
6 forecast."

7 Now, when I take all of your comments
8 together, and the especially focussing on that last
9 one, I am having some difficulty understanding why you
10 chose to shift up from 5 terawatthours from your
11 end-use model results. It's not clear why you chose 5
12 terawatthours, and perhaps you could explain.

13 A. As I indicated, I believe, we did not
14 wish to dismiss the econometric forecast for this
15 sector. The amount of 5 terawatthours was arrived at,
16 essentially, in consultation with the end-use group as
17 to what was the maximum amount that one could
18 reasonably add to the "other" or miscellaneous end-use
19 categories in tuning the model.

20 That is, if we accept the forecast for
21 the major end uses, the identified end uses, and
22 suggest that that the difference between the end use
23 and the econometric is in the rate at which
24 yet-to-be-identified uses of electricity grow. That
25 is, that is where the major uncertainty is for the

1 sector. Then putting an adder on to that component of
2 the forecast still had to satisfy some reasonableness
3 checks. So essentially, it was in that component of
4 the end-use forecast that an adjustment was made and it
5 was made to not exceed, I guess, in the judgment of the
6 end-use forecast a reasonable growth rate for that
7 "other" category.

8 Q. Perhaps this question should go to
9 Dr. Buja-Bijunas. It's not clear, then, to me, why it
10 was that you felt it necessary -- why didn't your
11 end-use model capture the growth that you expected to
12 see, or that for some reason you expect to, say, in the
13 miscellaneous category?

14 DR. BUJA-BIJUNAS: A. If I could perhaps
15 rephrase Mr. Burke, provided I do it correctly.

16 When we did the end-use forecast, that
17 really is from an end-use analysis perspective what
18 seems to us to be the most reasonable forecast using
19 that approach, end-use approach. So, if I had to come
20 out and say what to me seems the most reasonable
21 forecast using that approach, it would be the end-use
22 result.

23 What Mr. Burke is referring to is that
24 the most reasonable econometric approach result was the
25 EEMO result, and he weighted, or he looked at, what the

1 weaknesses and strengths of both approaches are, to
2 come up with his decision.

3 The 5 terawatthours, basically, is the
4 maximum that you could increase the commercial end-use
5 forecast and still maintain the various -- and still
6 maintain a good relativity between your various
7 assumptions.

8 The office equipment and your
9 miscellaneous category, they certainly have a lot of
10 uncertainty associated with them. They are high
11 growth, they are new technology, et cetera.

12 The growth that we ascribe to these two
13 end uses came about due to extensive consultation with
14 a number of bodies, either in Ontario or other
15 utilities in United States, et cetera. Now, there was
16 a range of growth that various other forecasters were
17 proposing. Some of the proposed growths were higher
18 than the growth that we used.

19 Keeping that in mind, if we were to
20 then -- we could have a higher growth in office
21 equipment and miscellaneous, and still be within the
22 various ranges proposed by other analysts, and still
23 maintain this relatively, with all the other
24 parameters, and still be relatively comfortable from
25 that perspective, but the most you would gain is 5

1 [11:58 a.m.] But then when it comes to, okay, how much
2 higher could it be, we went into the process that Dr.
3 Buja-Bijunas described. In previous forecasts, we had
4 fairly arbitrarily split the difference between the
5 commercial -- sorry, between the econometric and the
6 end-use forecast.

7 This time 'round, with better
8 disaggregation in COMMEND than in previous years, that
9 sort of a kind of resolution of the conflict between
10 the end use and the econometric results would have led
11 us to make changes which did not seem to be reasonable,
12 especially when you focus them on the office equipment
13 and miscellaneous end uses as Dr. Buja-Bijunas was
14 describing.

15 So, essentially, there is some valuable
16 information, I believe, in econometric forecast. In
17 tuning the end-use model to a recommended forecast, one
18 would hope to be able to do it without doing violence
19 to the end-use results, and we essentially chose to
20 move in the direction of the econometric result as far
21 as we reasonably could, which wasn't very far.

22 Q. For the residential and industrial
23 sectors, you stuck with your end-use model result.
24 Clearly then, there must be something different about
25 your commercial end-use models, you are just not as

1 comfortable with them.

2 A. For the commercial sector, yes. In
3 the commercial sector, we have a wide divergence
4 between the two results. Whereas in the residential
5 and industrial sectors, the difference in 2015 is much
6 narrower as a proportion of the total as is 25
7 terawatthours.

8 If you take the ratio of the econometric
9 to the end use, it is 25 over 90 roughly 30 or 40 per
10 cent difference. And in the industrial sector, I think
11 the difference is 5 per cent. And the residential
12 sector, I think it is 10 or 12 per cent; something like
13 that.

14 And there were things that we could cite
15 which would make us feel more comfortable with the
16 end-use analysis pure and simple as to account for
17 differences of that sort of order. But in the
18 commercial sector, they are just very large differences
19 to explain here and rather than dismiss them out of
20 hand, we felt obliged to accommodate them, but only to
21 a modest extent.

22 Q. To the maximum which your end-use
23 models would make sense, your end-use model result
24 would make sense?

25 A. Yes, that's right.

1 Q. Just a few questions relating to the
2 role of Ontario Hydro in what I will call lobbying
3 efforts, and I think I will address this to you, Mr.
4 Burke. You have indicated, and I believe you have all
5 indicated, that your job is to be as neutral as
6 possible in attempting to forecast for the future. Is
7 that correct? Is that a fair statement?

8 A. I will speak for myself, yes.

9 Q. I presume that the other members of
10 the panel feel similarly? You are nodding yes, both of
11 you?

12 MR. ROTHMAN: A. Yes.

13 Q. Does Ontario Hydro as a corporate
14 body, in other of its departments or divisions - and
15 you may not know but you will just have to listen to
16 the question and decide - engage in promotion or
17 lobbying for standards that are not yet certain enough
18 to have been incorporated in your end-use and
19 econometric forecasts?

20 MR. B. CAMPBELL: Can we have a
21 description of what is meant by "lobbying," here? It
22 has a wide range of popular usages.

23 MS. KLEER: Q. What I am getting at is,
24 does Ontario Hydro submit papers or letters to, I
25 presume, the Ministry of Energy, to get at, to support

1 a move towards a standard that Ontario Hydro believes
2 ought to be achieved?

3 DR. BUJA-BIJUNAS: A. Well, there are
4 one or two people - I am not sure how many people there
5 are - in energy management branch who are working with
6 the Ministry of Energy and not necessarily setting
7 standards but are assisting in the efforts in
8 identifying standards. So there is a resource set
9 aside by Ontario Hydro to assist in this standard
10 formation.

11 MR. BURKE: A. Could I just add
12 something?

13 Q. Sure.

14 A. Probably there are people in Panel 4
15 who can maybe amplify this, but I do believe that
16 Ontario Hydro has actively supported the development of
17 a new national building code, or is currently actively
18 supporting that - I believe, financially. I am not
19 sure. That's something which Panel 4 can check.

20 But, what that code is, I don't know if
21 it has been determined, but I think the idea that a
22 revised higher standard for building is being supported
23 by Ontario Hydro, probably the Ministry of Energy, as
24 well.

25 Q. Within your department, you gather

1 this plethora of information about end use, about where
2 efficiency fits in. It would seem to me that your
3 department has a lot of information that might be taken
4 and analyzed to say, 'Well, where should efficiency
5 improvements be directed towards?' Does your
6 department get engaged in any of those kinds of
7 discussions?

8 DR. BUJA-BIJUNAS: A. One of the reasons
9 why we do end-use forecasting is so that we can supply
10 energy consumption information by end use to the people
11 who are doing DSM analysis. So, we do actively provide
12 our numbers to the individuals, to the analysts who are
13 doing that.

14 In addition, there is certainly
15 discussion back and forth, since one of our concerns is
16 that efficiency improvements that are incorporated in
17 the basic load forecast aren't double-counted in the
18 DSM estimation. So, there is discussion back and forth
19 and the end-use results are used.

20 But certainly, I don't want to get into
21 anything, any details regarding the DSM estimation, but
22 they deal a great deal in technology-specific issues
23 more so than the end-use forecast does right now.

24 Q. I guess what I am also trying to
25 understand is that you have given information and

1 evidence about how it is that Ontario Hydro in its
2 forecast department is "value neutral," if I can use
3 that term, about where efficiency improvements are
4 going to occur.

5 These discussion that you have with the
6 DSM people, are they driven by policy directions that
7 you are getting from the Ministry of Energy? Or do
8 they come internally? And do you go, then, to the
9 Ministry of Energy with what you in your analysis have
10 discovered might be a worthwhile avenue to pursue?

11 MR. BURKE: A. I think that there have
12 to be distinguished two things here: the production of
13 the basic load forecast, and the use of end-use
14 information for estimating electrical efficiency
15 improvement.

16 And if we are focussing on the basis
17 forecast, could you rephrase your question or repeat
18 it, so that I understand what you mean, just in the
19 context of the basic? And then, maybe, we can address
20 the EI separately.

21 Q. I think my question is directed
22 towards the use of end-use information in policy
23 direction. All I am trying to get at is, do you,
24 independent of any direction you get from the Ministry
25 of Energy, take your end-use information, discuss it

1 with the DSM people, and derive independently where it
2 might make sense to direct energy efficiency
3 improvements?

4 I am just trying to understand: Do you
5 engage in policy-making, in a sense, by the work that
6 you do with your end-use information?

7 DR. BUJA-BIJUNAS: A. That's a difficult
8 question to answer. The efficiency improvements that
9 are inherent in the basic forecast for end use are very
10 much established by independent analysis, technologies,
11 sales by various manufacturers. It is that sort of
12 analysis, and that underlies the basic forecast.

13 In addition, there is the impact of
14 standards which is in the basic forecast. And what
15 standards have been enacted and which appliances they
16 pertain to, that sort of information is obtained by
17 direct consultation with the Ministry of Energy. As
18 far as what the impact of those standards are, in terms
19 of energy consumption, we do that calculation.

20 So, often they will say the following
21 models, or refrigerators of the following sizes, will
22 be 10 per cent more efficient, for example. The impact
23 on load forecast -- and then, we calculate it, because
24 we have to consider turn-over rate, and how old the
25 stock is, and at what rate this sort of efficiency

1 improvement would impact on electricity demand. So, we
2 do the calculation using information from Ministry of
3 Energy for standards.

4 Q. I think it's becoming clear to me.
5 I'm looking, basically, at the DSM portion, what
6 happens after it.

7 A. Okay.

8 MR. BURKE: A. And there, I think, we
9 will discuss that more in Panel 4. But certainly, as
10 Dr. Buja-Bijunas has said, the end-use analysis
11 underpins the estimate of potential for demand
12 management; that is, that the load that would otherwise
13 occur, say, for office lighting, in the year 2000 to
14 2010, is from the end-use forecast.

15 And then, someone may suggest that the
16 technology exists to improve efficiency of that X per
17 cent, and that becomes the potential for efficiency
18 improvement in that sector. And the next stage is to
19 say, well, what proportion of that will be
20 realistically obtained by the year 2000 or 2010?

21 And so the attainable potential is
22 developed, and once those numbers are in place and all
23 added up, we can derive the primary load forecast.
24 Clearly the estimate of economic potential for
25 efficiency improvement provides a - I will be careful

1 to say "upper bound" - but it provides a large quantity
2 of potential efficiency-improvement opportunities which
3 various policies or standards or programs could be
4 developed to exploit.

5 Q. But then, I guess, my final question
6 would be, you as forecasters don't get involved in
7 actual development of those policies?

8 DR. BUJA-BIJUNAS: A. No. What we do is
9 that we have household forecasts and we have physical
10 unit forecasts, et cetera. We have information on
11 efficiency that would be occurring in the marketplace.
12 We put it all together and we have a picture of how
13 energy is used by various end uses across the province.

14 That picture is relayed to the people who
15 do the estimation of potential DSM savings, and, using
16 that picture, they then carve out what additional
17 savings at what costs, et cetera, if possible.

18 Q. Mr. Burke, if you can turn to Volume
19 3 of the transcript, at page 484 and 485. That's from
20 April 24th. Do you have that in front of you?

21 MR. BURKE: A. Yes, I do.

22 Q. You indicated, Mr. Burke, in your
23 answer to a question from your counsel about why you
24 don't attempt to define futures that, "Hydro does not
25 feel it is its role to choose an alternative

1 socio-economic future [sic] for Ontario." And I am
2 looking here at page 485, line 15.

3 Is that correct?

4 A. That's correct.

5 Q. You would agree with me, would you
6 not, that the forecast which your department has
7 produced has been used by system planning to plan for
8 supply options that, if approved, could have large
9 socio-economic impacts on certain parts of the
10 province; is that right?

11 A. Ontario Hydro's plans would have
12 socio-economic impacts. I wouldn't want to qualify
13 them. I don't believe I have a sense of what those
14 impacts are and of what "large" means in this context.

15 Q. You would agree with me, though, that
16 Ontario Hydro using your forecast system planning does
17 planning that, if the projects are approved, could at
18 least have an impact upon a socio-economic future? I
19 mean you are not denying that there are impacts?

20 A. Are you talking now about
21 site-specific things?

22 Q. I am talking about --

23 A. Or are you talking about a certain
24 amount of money being spent and that affects the growth
25 of the province or...?

1 Q. Let me give you an example. Ontario
2 Hydro has adopted a basin-wide approach to planning for
3 hydraulic development in the Moose River Basin. They
4 have adopted that approach. You would agree with me
5 that by adopting that approach, they are in fact going
6 to have an impact upon a socio-economic structure in a
7 part of the province. You are not saying -- I guess
8 what I am getting at is you are not saying that Hydro's
9 use of your forecast doesn't result in changes in
10 socio-economic futures?

11 A. I think what I said was that, "Hydro
12 does not feel it is its role to choose an alternative
13 socio-economic framework for Ontario." And what I mean
14 there is that we are not going to restructure the
15 economy as a whole, move to a centrally-planned economy
16 as opposed to a market economy, move to sustainable
17 development as opposed to what we are doing now if we
18 are not sustainable, and so on.

19 And I think the sort of thing you are
20 talking about is slightly different: Is there a
21 socio-economic implication of a plan or any plan or all
22 plans? I am sure there are socio-economic implications
23 of all plans.

24 Q. And if you take a part of a plan that
25 focusses on a particular geographic location?

1 A. That's not what we are doing here and
2 that not what I have talked to. I have talked about
3 things that pertain to the province as a whole in
4 forecasting electricity demand for the province as a
5 whole. How the planners choose to meet that demand and
6 what the socio-economic implications of that are,
7 probably a lot of what will be discussed in future in
8 this hearing. But I don't think that it speaks to what
9 I was talking about here.

10 Q. All right. That's fine.

11 You have indicated, Mr. Burke, that
12 following preparation of the load forecast by your
13 department, you submit that load forecast first to an
14 external body and then, finally, it goes to the board
15 of directors for approval in its December meeting; is
16 that correct?

17 A. With a few stages in between, yes.

18 Q. Are you present at the meeting of the
19 board of directors?

20 A. Yes.

21 Q. And what actually happens when you
22 present it? Are you asked questions about its
23 implications? Just tell me briefly what happens during
24 the course of the meeting.

25 A. Yes, I am asked questions about the

1 load forecast, not about its implications, but about
2 the load forecast.

3 Q. Is anyone from system planning
4 present with you at that meeting?

5 A. I don't think so, no -- I mean, the
6 vice president, the vice president of corporate
7 planning, I think, attends, who is responsible for the
8 system planning division and our division.

9 Q. Are you aware that Premier Rae has --
10 or, rather, intends to appoint an aboriginal
11 representative to sit on the Ontario Hydro board of
12 directors?

13 A. I think I--

14 Q. You read it in the paper?

15 A. --received an announcement that that
16 was happening, yes.

17 Q. Would you be prepared, given the way
18 that you prepare your load forecasts at this time, to
19 answer questions put to you by that aboriginal
20 representative as to how your load forecast has taken
21 into account the energy needs of First Nation
22 communities?

23 MR. B. CAMPBELL: Just a minute. Are we
24 talking about at the board meeting?

25 MS. KLEER: At the board meeting.

1 THE CHAIRMAN: At the board meeting, yes.

2 MR. BURKE: I think that we have
3 indicated that with the change in rate structure in
4 April '89, that in the year 1990 we have included the
5 remote system load forecast in with our comprehensive
6 customer system forecast, and so the remote system
7 forecast is now a part of the short-term forecast and
8 therefore forms the base, is part of that base, which
9 is extrapolated into the future.

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1 [12:15 p.m.] For the short-term, we would have
2 explicit information from the communities themselves
3 that are supplied to our office in Thunder Bay.

4 Beyond about 1995, we don't make any
5 specific forecasts for any particular region of the
6 forecast, in the sense that we can tie it into end-use
7 or econometric or whatever detail.

8 There is an extrapolation provided to the
9 transmission people, but with a considerable lag in
10 time that essentially extends the customer forecast,
11 using the weights that are in the short-term forecast
12 out to the long-term, in a very mechanical sort of
13 way; that is, maintaining shares and so on, of each and
14 every customer. But that doesn't really present a lot
15 of insight about where customer loads are going.

16 MS. KLEER: Q. I guess what I am really
17 looking at, though, is the question of whether or not
18 your forecast information, and the way that you produce
19 it, tells you anything at all, and therefore allows to
20 you to answer questions about the energy needs of First
21 Nation communities, and whether or not your forecast
22 incorporates those or somehow recognizes those?

23 MR. BURKE: A. At the customer level, it
24 has always been Hydro's practice to get forecasts from
25 the customers and incorporate them in the preparation

1 of the short-term forecast.

2 In practice, what happens is that the sum
3 of the customer forecasts is then compared to what
4 model-based forecast suggests for the province as a
5 whole, and there is a sort of prorating process that
6 goes on to bring the two in line, but without adjusting
7 any individual customer forecast. It's done sort of by
8 region of the province, so that the total corresponds
9 to the sum of the parts.

10 The reason I am saying all this is
11 essentially we don't forecast what our individual
12 customers require; they forecast what they require, and
13 we incorporate that into the short-term load forecast.

14 And essentially, the change, as I see it,
15 would be that, in the past, the remote system forecast
16 has been dealt with somewhat independently, because it
17 did not bear on the planning of this system as a whole,
18 or the revenue requirement of the system as a whole.
19 But with the change in revenue requirement, the remote
20 system costs have to be included in the total revenue
21 requirement of Ontario Hydro. And so we are including
22 the remote system load forecast in our load forecast.
23 But the source of that forecast remains the same. It
24 is provided by our customers and probably results from
25 an interaction between our regional staff and the

1 people in the communities that are served.

2 Q. Let's assume someone asks you at the
3 board of directors' meeting, does your forecast account
4 for the energy needs of First Nation communities,
5 whether on-grid or off-grid, because there are also
6 First Nation communities that are on-grid, you would
7 say, would you not, that your forecast as an aggregated
8 whole, yes, it, in fact, accounts for their energy
9 needs because of the way you do it?

10 A. Maybe you could explain exactly what
11 you mean by "accounts." Do you mean have we included
12 the needs or are we paying special attention to the
13 needs?

14 Q. Could you say that your basic load
15 forecast meets the energy needs of the First Nation
16 communities?

17 A. You mean have we included enough
18 electricity in our forecast to make sure that the First
19 Nation's communities demands are satisfied?

20 Q. That's right, that is what I am
21 asking.

22 A. I am confident of that.

23 Q. But you certainly wouldn't be able to
24 tell it on a community-by-community basis, given the
25 way you produce your forecast?

1 A. Well, for the first five years I can,
2 yes.

3 Q. For remotes as well?

4 A. Yes.

5 Q. Do you at this meeting, before you
6 get to the meeting talk to the RCES, the Remote
7 Community Electricity Supply Manager - I am not sure if
8 that's his title - before you get to this meeting?

9 A. The board meeting in December?

10 Q. Yes.

11 A. Well, I think I will have to -- as I
12 say, this is a relatively recent change because of the
13 rate structure. And this is the first year we have
14 included -- that is, the load forecast department has
15 included the forecast of the remote system in its total
16 customer forecast base.

17 The sort of seasonal pattern is that,
18 actually, right now, the forecasts at the customer
19 level are being finalized and returned to our office.
20 So what I would have by next fall is the early 1991
21 forecast from those communities and...

22 Q. I presume then that your answer to my
23 earlier question about whether or not you could say
24 that your basic load forecast accounts for their needs
25 is based upon the assumption that the customer

1 forecasts that are done, the way they are done in the
2 remote systems, adequately forecasts for their energy
3 needs, you have to assume that.

4 A. Okay, let's put it this way: I have
5 not developed an independent view as to whether or not
6 the forecasts supplied by our customers are good
7 forecasts. If that's what you are asking, have I
8 assessed those forecasts to say whether I think that
9 customers are supplying good forecasts, I think for the
10 remote community, I would have to say, at this point,
11 we have not yet done that. For the customers that we
12 have served over a long period of time in the main
13 system, and for which the load forecast department has
14 monitored the data over many years, I think we have a
15 better sense of what constitutes a reasonable forecast.

16 It is also the case that there is a major
17 rate structure change because of the change in rates as
18 of April 1989. And I could not be sure that the local
19 forecast has, in my view, adequately captured what the
20 effect of that rate structure change may be on local
21 load. It does strike me, from looking at the numbers,
22 that a fairly healthy growth in the remote community
23 forecast is implied. I think --

24 Q. We will get to that interrogatory at
25 a later point.

1 THE CHAIRMAN: Does your question also
2 imply whether or not there are adequate facilities
3 available to the people you are referring to?

4 MS. KLEER: I don't think he can answer
5 that question.

6 THE CHAIRMAN: Pardon?

7 MS. KLEER: I would like to ask that
8 question of him but I can't --

9 THE CHAIRMAN: Your question could be
10 interpreted that way, and, I take it, that's not part
11 of your question?

12 MS. KLEER: No, that can't be part of my
13 question.

14 MR. BURKE: Just to give an indication.
15 I think 1990 forecast for the remote communities --
16 sorry, the 1990 actuals for the remote community system
17 is 26 gigawatthours, and that is forecast to, according
18 to the numbers I have here, double in the next five
19 years.

20 The 1995 forecast is 53.8 gigawatthours.
21 That probably is one the fastest growing loads in the
22 system.

23 That's my understanding of the forecast
24 we get from the customer. And I think that given that
25 we are now have increased responsibility in this area,

1 we are going to have to assess that more carefully,
2 just to see what we think about it.

3 Q. But you haven't done that yet?

4 A. No. As I say, last year was the
5 first year we included the numbers at all and we have
6 not, I don't think, analyzed it.

7 Q. Just one further follow-up from that,
8 then. Have you done any methodological assessment of
9 the forecasting techniques that are used in the remote
10 community electricity system at this time?

11 A. No.

12 Q. One other small area I would like to
13 focus on is the review of your load forecast that
14 happens, or that takes place in front of that external
15 body of 15 people. Is it 15 people?

16 A. That was the economics. I don't know
17 how many -- it's about a dozen for the load forecast.

18 Q. That's what I am talking about, the
19 load forecast. How long do they actually take to
20 review this?

21 A. It's a day-long session and we
22 provide them with all the material about a week in
23 advance.

24 Q. All the material, what do you refer
25 to?

1 A. Essentially, drafts of what turns out
2 to be in the 1990 load forecast report.

3 Q. But not the supporting documentation
4 behind the load forecast report?

5 A. I think they got the works this year.
6 Yes, I think they got what we are calling the main
7 reports by end use, and the econometric report, so
8 exhibits --

9 DR. BUJA-BIJUNAS: A. Exhibit 16, 17,
10 18?

11 MR. BURKE: A. And 77, I think is the
12 econometric one. In addition to a draft of most of
13 Exhibit 9.

14 Q. We have spent a lot of time here
15 trying to review your load forecast. Into what depth
16 do the external reviewers actually go in looking at
17 your load forecast? Do they just look at does your GDP
18 assessment make sense? What do they actually look at?

19 A. Well, I think we try to highlight
20 issues that are controversial and get their views on
21 them. We give them the context, an overview of the
22 forecast. I think we try to make sure that the
23 discussion touches on controversial questions and the
24 extent to which we should change or modify our forecast
25 in order to address those.

1 Q. You are aware, I take it, that in
2 other utilities such as -- well, the electrical
3 utilities in Massachusetts, that they produce their
4 load forecasts, and then the Massachusetts Energy
5 Utilities Siting Council has to review their load
6 forecasts. Is that something that you would know?

7 A. Well, I am not sure I am familiar
8 with Massachusetts' particular situation. I am
9 certainly familiar that various places in the United
10 States have various bodies to review the load
11 forecasts. California Energy Commission reviews the
12 forecasts of all the utilities in California.

13 Q. Just focussing on California, doesn't
14 the California Energy Commission actually produce the
15 load forecast and then give it to the utilities?

16 A. No.

17 Q. It's not that way?

18 A. No. It gets the utility forecast,
19 they produce their own forecasts to check the forecast
20 of the utilities and they argue over it and come up
21 with a recommended position.

22 Q. And you would agree with me, though,
23 that that California review process and the review
24 process that I have told you about - I mean, this is
25 what I am told - the Massachusetts Siting Council

1 Review is the more extensive review of the load
2 forecast than occurs by the external body of reviewers
3 that you use in Ontario?

4 A. I think that's fair, yes.

5 Q. Would you as a load forecaster feel
6 more comfortable about your load forecast if it were
7 subjected to a greater degree of review than what it's
8 currently subjected to?

9 A. The long-term forecast -- the
10 short-term forecast gets a lot of attention at the
11 Ontario Energy Board every year, but it is a fact that
12 the long-term load forecast does not have a regular
13 board or hearing to address its merits.

14 Q. Would you feel more comfortable if it
15 did? You might not like it, but would you feel more
16 comfortable?

17 A. Would the forecast be better as a
18 result?

19 Q. Yes, which I presume would make you
20 more comfortable.

21 A. I think it would improve as a result
22 of more dialogue. I would like to think that it
23 wouldn't change very much because we try to do a good
24 job and so on. But certainly I would be more confident
25 in my forecast if -- and I would certainly be able

1 to -- it's very important that the forecast has some
2 credibility. And certainly, if endorsed by an
3 organization such as that, I think it would enhance the
4 credibility of the forecast.

5 Q. All right. Now, I am going into my
6 last set of questions which will go on for quite a
7 while, and they relate to how remote communities are
8 dealt with in the forecast and what the implications
9 are. So I expect there may be the occasional
10 objection, but we will deal with that if that happens.

11 If we could look at Interrogatory 2.10.6,
12 which is in your package.

13 A. Pardon me, 2.10...?

14 Q. Yes. I appreciate that you haven't
15 prepared these responses, but I just want to refer to
16 ti.

17 A. You mean it's not in the package?

18 Q. It's not in the Panel 1 package, but
19 it is in the package, though.

20 A. Fine.

21 Q. And then I will also be referring to
22 1.10.2, which should follow in the Board's package.

23 Do you have those in front of you, Mr.
24 Burke?

25 A. Yes.

1 Q. The 2.10.6 we asked the question:

2 Please indicate the year in which Ontario Hydro grid
3 service was extended to each formerly remote First
4 Nation community.

5 We asked a number of questions. And the
6 response came back: The DSP was developed to address
7 the needs of the bulk electricity system.

8 And then in 1.10.2, this is a question
9 relating to how much energy is consumed by NAN, Treaty
10 #3 and Teme-Augama Anishnabai. In the second paragraph
11 of that response, the answer came back: Ontario rural
12 communities are either grid connected or remotely
13 serviced. And then, you list a number of
14 remotely-served communities, the majority of which are
15 from Nishnawbe-Aski Nation.

16 Now, if I read those two answers
17 together, I got the understanding that the 1988 basic
18 load forecast relied on for the DSP did not include
19 forecasts for the energy and peak for remote
20 communities; is that correct?

21 A. Yes, I think that is correct.

22 Q. So is it fair to say, then, that the
23 DSP, which is underlain by your basic and primary load
24 forecasts, can't be said to have been designed to meet
25 the energy and peak needs of remote communities?

1 MR. B. CAMPBELL: Just a minute. I don't
2 think this panel can speak to this. They are not the
3 planners and this matter has been argued, as I
4 understand, by Mrs. Formusa, previously, before the
5 Board. The planning that is done for the remote
6 communities has been described in a document that has
7 been filed subsequent to that motion.

8 THE CHAIRMAN: I think this witness can
9 answer the extent to which the DSP forecast reflected
10 the consumption by remote communities.

11 MR. B. CAMPBELL: I think he has answered
12 that question.

13 MS. KLEER: Yes, all right.

14 MR. BURKE: Without sticking my neck out
15 too far, I do believe what I said earlier was that the
16 1990 forecast does.

17 MS. KLEER: Q. I appreciate that, we
18 will get to that. But for those communities, those
19 First Nation communities that are on the grid, in your
20 opinion, the basic road forecast does, in fact,
21 forecast for their energy needs?

22 MR. BURKE: A. Certainly.

23 Q. Now, could you explain to me, in
24 general, the purpose for doing the forecast, just very
25 general terms?

1 A. The purpose?

2 Q. Why do you do a forecast?

3 A. We do a load forecast to underlay the
4 planning process at Ontario Hydro, to provide
5 information about the future which planners can use in
6 attempting to meet the energy service requirements of
7 Ontario.

8 Q. And if you can turn with me briefly
9 to page 19-1 of the DSP where the general purpose of
10 the program is described, and I can just read it to
11 you. If you want to have it in front of you, that is
12 fine, too.

13 It says here:

14 "The general purpose of the program is
15 to ensure that a continuing reliable
16 electricity supply is provided in Ontario
17 in a manner consistent with the
18 Demand/Supply Planning Strategy..."

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1 [12:38 p.m.] Now, that purpose, I take it -- or,
2 rather, the purpose of forecasting, fits with that
3 purpose. I mean those two purposes can be met at the
4 same time; in fact, you do your forecast in part to
5 meet that?

6 A. Yes, as I pointed out, the basic load
7 forecast is the starting point for demand/supply
8 planning; that is, to look at the resources, whether
9 they be demand side or supply side, to meet the
10 electrical service requirements in Ontario.

11 The primary load forecast is really the
12 basis for the supply planning, and I think the sentence
13 you referred to is really at that stage.

14 Q. Would you agree with me - given you
15 have stated that the 1988 basic load forecast didn't
16 forecast for remote communities for reasons that --
17 well, you've told me why in 1990 it did - that a more
18 accurate description of the purpose might read as
19 follows, and I will just read this:

20 "The general purpose of the program is
21 to ensure that a continuing reliable
22 electricity supply is provided to the
23 people of Ontario, except those people
24 who live in remote communities, not
25 connected to the bulk electricity

1 system."

2 MR. B. CAMPBELL: Just a minute.

3 THE CHAIRMAN: I think this is a question
4 you might ask another panel. I understand your point;
5 it is a good point, and I think we are quite aware of
6 it. But I don't think that these people are the people
7 that can answer that question. They do what they are
8 asked to do, and I think they have described what they
9 have done.

10 MS. KLEER: All right then, I will
11 reserve my question to a later panel.

12 MR. B. CAMPBELL: Mr. Chairman, in that
13 regard, I do think this is a matter that has been
14 addressed previously. In terms of the planning
15 application that is in front of you, we do take the
16 position that it relates to the supply that is provided
17 by the bulk electricity system. There is a separate
18 process in place for the supply to remote communities
19 and it is described in the process document that has
20 been provided both to the Board and to intervenors and
21 is covered under the exemption that was circulated at
22 the same time.

23 In leaving this, I don't want Ms. Kleer
24 to be under any misapprehension about the position we
25 take with respect to this application. I don't think

1 we need to get -- I am not trying to get back into that
2 argument, but I want to be clear. And I think it's
3 fair that I be clear at this point to Ms. Kleer, that
4 that is the position that Ontario Hydro takes in this
5 matter.

6 MS. KLEER: I appreciate your
7 clarification. All I am trying to get clear on the
8 record is what the purpose of this program is. And
9 that's my point.

10 MR. B. CAMPBELL: I think that's a matter
11 that is a defined matter for purposes of the
12 application and I think I have tried to explain exactly
13 where this distinction is made between the remote
14 communities which have a particular planning process
15 and the concerns with respect to the bulk electricity
16 system.

17 THE CHAIRMAN: Well, this is an issue
18 that has been raised before, and I don't think it can
19 be resolved perhaps in this context of the
20 cross-examination of the forecasters.

21 I just think that for this particular
22 purpose that we are here right now is to ask these
23 forecasters questions and I think that particular issue
24 has been answered by them as to what their forecast was
25 and what they did. They are not the people who are

1 involved in deciding what the plans are, as they have
2 said on many occasions previously.

3 MS. KLEER: Q. Mr. Burke, in 1988, when
4 you produced the basic load forecast, did you receive
5 any specific directions from any other department that
6 you shouldn't include remote communities, or had that
7 always been the practice that you didn't include remote
8 communities in the forecast?

9 MR. BURKE: A. It had always been the
10 practice that we did not include remote communities in
11 the forecast.

12 Q. And why was it, that practice?

13 A. Because both the supply and the
14 accounting of costs was done separately from the bulk
15 electric system. And the reason for including them in
16 1990, as I understand, largely relates to the
17 accounting for costs. But I am not sure what the
18 implications are for planning.

19 Q. I am not asking you those questions.
20 Did you, in developing the basic load forecast for
21 1990, now, cover off or account for the potential that
22 over the next 25 years some portion of the now remote
23 native communities would get hooked up into the bulk
24 electricity system? Is that something that you
25 specifically took in account?

1 A. Well, for the purpose of the load
2 forecast, it doesn't matter whether they are hooked up
3 or not. We have a load forecast which is for the
4 total.

5 Q. Including the remotes?

6 A. Including the remotes implicitly.

7 THE CHAIRMAN: Do I understand you
8 correctly? It doesn't matter whether they are hooked
9 up or not as far as the load forecast?

10 MR. BURKE: That's correct. We have a
11 forecast now for the demand for electricity in those
12 communities; whether it is served by remote diesel or
13 part of the grid is a planning issue.

14 THE CHAIRMAN: I see.

15 DR. CONNELL: It is assumed that prices
16 will be the same, regardless?

17 MR. BURKE: Well, that's the effect of
18 the price change, I believe, that was introduced in
19 April 1989, that the rates for the remote system, I
20 think, are the same as the rates that apply in the --

21 MS. KLEER: Q. Except for the government
22 rate which was unchanged.

23 MR. BURKE: A. Okay, except for the
24 government rate which is unchanged, which apply for the
25 rural retail system as a whole.

1 Q. But your answer, then, saying that
2 the 1990 forecast would account for them, assumes that
3 their energy demand would be the same if they were on
4 the remote, or if they were hooked up to the bulk
5 electricity system?

6 A. As I said, we have not done a
7 detailed analysis as to whether or not the remote
8 system loads - and I think there is an interrogatory
9 response that gives directionally where that would go -
10 in adjusting to the price reduction that came into
11 effect and various other restrictions that were taken
12 off, whether, in fact, the load forecast that I just
13 described, which roughly doubles in five years, is a
14 good estimate or not. From a distance, it seems a
15 fairly healthy growth rate compared to everything else
16 that is going on in Ontario.

17 But certainly, beyond 1995, there isn't
18 an explicit treatment of the remote communities. It is
19 just implicitly growing along with the rest of the
20 system. We do not have a specific forecast for the
21 remote communities from '95 to 2015.

22 To put the remote communities into
23 context, it currently is two one-hundredths of a per
24 cent of the total provincial load, and we could go
25 quite far wrong on that. And in the sense in which you

1 have been asking the questions, if I have understood
2 them correctly, we would have still adequately
3 accounted for the demand for the remote system.

4 I think the issue is probably more how it
5 is supplied rather than whether we have accounted for
6 it in terms of the growth in load forecast.

7 Q. You have talked about how the rate
8 structure has been -- well, the forecast for the
9 remotes has doubled over the next five years. But
10 still you haven't done the next or you haven't done
11 another step, which is to question how much the
12 forecast might change for those remote communities, if
13 one or more of them were to be hooked up to the grid.

14 A. Why would it change?

15 Q. Well, that's my question to you.

16 A. Nothing is going to change. Except
17 the price is already set at the grid rate, so
18 essentially we are already in a position that it
19 doesn't matter from the point of view of demand
20 forecasting whether the customers are on the grid or
21 not. They are facing the same price whether they are
22 on or off. And so determination of demand, unless
23 there was some restriction, that is, we ended up in a
24 situation where demand exceeded the ability of the
25 community to supply.

1 Q. And you are not in the position to
2 answer that question?

3 A. Certainly not.

4 Q. I take it that in producing the 1990
5 load forecast, you don't actually go to the remote
6 communities, your department doesn't, you just simply
7 take what you get from the RCES?

8 A. That's correct. The superintendent
9 of RCES -- I don't know how many staff he has, but they
10 are responsible for interfacing with the communities
11 and developing the forecast for that system.

12 Q. In your discussions with the RCES
13 branch, did you question them as to whether or not they
14 had looked at the possibility that some remote
15 communities that are not served at all by Ontario Hydro
16 at this time might in fact be hooked up to the grid?

17 A. My understanding is that there are
18 three communities that are not currently part of the
19 remote system that are going to be hooked up in the
20 next year or two.

21 Q. Are those three accounted for in your
22 forecast?

23 A. One moment.

24 Q. While you are at it, you might check
25 whether there are any other communities beyond the next

1 few years that you are aware of might be hooked up --
2 or not might be hooked up, might in fact come to be
3 serviced by the RCES division?

4 A. I am not aware of any other than the
5 three I mentioned. And I think it would take me a
6 while to sort out whether the three names -- let me
7 just give you the names of the communities that I have
8 here, that I understand are yet to be hooked up. One
9 is Wapekeka, one is Kingfisher, and one is Marten
10 Falls.

11 Q. Maybe at this, it might be helpful if
12 I just file as the next exhibit the letter that I
13 received from -- a copy of which, rather, I received
14 from Mrs. Formusa, which is addressed to Ms. Morrison,
15 dated May 8, 1991. And attached to this as well is the
16 exemption order OH 34, which is Ontario Regulation
17 392/89.

18 Do you have a copy of that, Mr. Burke?

19 A. I do.

20 Q. If you look at page 2 of that letter,
21 the second-to-bottom paragraph:

22 "Ontario Hydro currently provides
23 electricity to 22 remote communities
24 through on-site generation. In
25 collaborative projects with both

1 provincial and federal governments, it is
2 anticipated that by the mid-nineties that
3 an additional 13 remote communities
4 (containing 25 or more residential
5 dwellings) will receive service."

6 I take it, you haven't accounted for the
7 other ten communities that would seem to be implied by
8 this statement?

9 MR. B. CAMPBELL: Just a minute. Could I
10 go back? I am not sure that -- I think there is a
11 little bit of confusion creeping in here. If I could
12 help straighten it out, I would like to, or you can
13 tell me to sit down.

14 But, Mr. Burke's answer with respect to
15 the three was with respect to connections to the grid--

16 MS. KLEER: Oh, pardon me.

17 MR. B. CAMPBELL: --not how many were
18 potentially going to be served by way of the planning
19 that's done for the remote system. So I think there
20 were some ships that passed here, and I am just a
21 little concerned about the number and we get it
22 straight.

23 MS. KLEER: Well, I am surprised by your
24 clarification, because my understanding is the three
25 communities he has referred to are ones that are not

1 served at all and now will be served by the remote
2 system.

3 MR. B. CAMPBELL: What he actually said,
4 according to my notes, was that they would be connected
5 to the grid. I may be wrong.

6 THE CHAIRMAN: No, I had that.

7 MS. PATTERSON: He did say hooked up to
8 the grid.

9 MR. BURKE: Okay, sorry. I will be very
10 careful here.

11 You are right as far as I understand it,
12 Ms. Kleer. The three communities I was talking about
13 were communities which would be served by the remote
14 system, added to the remote system.

15 MS. KLEER: All right.

16 Q. And then the additional -- well, this
17 letter refers to 13 communities and I take it then you
18 don't know the other ten communities and you haven't
19 accounted for them in your forecast for 1990?

20 MR. BURKE: A. It seems to be the case,
21 yes.

22 Q. Perhaps this letter should be given
23 an exhibit number.

24 THE CHAIRMAN: Could you give an exhibit
25 number for the letter?

1 THE REGISTRAR: 132, Mr. Chairman.

2 THE CHAIRMAN: Thank you.

3 MR. B. CAMPBELL: Should that also
4 include, Mr. Chairman, the procedural document that is
5 referred to in the letter and the exemption order
6 attached?

7 THE CHAIRMAN: The exemption order is
8 attached to the copy.

9 MR. B. CAMPBELL: I am talking about the
10 procedural document that goes with it.

11 MS. KLEER: I would be content with that,
12 that's fine.

13 Just for the record then, this procedural
14 document is entitled "Remote Community Energy Supply
15 Procedural Document." It is dated May 1987. And it
16 was prepared in support of procedural exemption order
17 OH 34.

18 ---EXHIBIT NO. 132: Letter to G. Morrison from L.
19 Formusa, dated May 8, 1991; document
20 entitled "Remote Community Energy Supply
Procedural Document."

21 MS. KLEER: Q. Mr. Burke, did your
22 department attempt to model or run any simulations
23 about what the change would be in the load forecast
24 where all of the now remote communities that are not
25 served by Ontario Hydro would be added into the load

1 forecast because they came to be serviced by Ontario
2 Hydro?

3 MR. BURKE: A. Are we now talking about
4 the 3 or the 13?

5 Q. No, I am talking about all of those
6 communities that are currently unserved by Ontario
7 Hydro.

8 THE CHAIRMAN: So the 13, plus an unknown
9 number in addition --

10 MS. KLEER: That's right. I mean Ontario
11 Hydro is aware of the remote communities, those that
12 exist. If you look at the procedural document -- I
13 appreciate that not everybody has full copies of that.
14 I believe the Board does. If you turn to page 4 of
15 that procedural document.

16 DR. CONNELL: What exhibit number,
17 please?

18 MS. KLEER: That's the last exhibit.

19 At page 4 there is a map that shows
20 remote northern communities in Ontario and describes by
21 way of legend whether or not they are with or without
22 community electrical systems.

23 Q. My question is, has Ontario Hydro
24 looked at all of these and said, well, let's assume
25 that over the next 25 years, all of the communities

1 that are currently unserved by Ontario Hydro might come
2 to be served by Ontario Hydro during the course of the
3 25 years? Is that something you have done?

4 MR. BURKE: A. The short answer is no.
5 From the perspective of, am I concerned that the
6 provincial load forecast is inaccurate as a result,
7 these numbers would be very small and really don't bear
8 on that question.

9 The question that they do bear on is very
10 local planning, and we don't do the same sort of thing
11 for any part of Ontario; that is, we don't particularly
12 look to where towns don't exist today and say, "25
13 years from now, there might be a town there which we
14 will have to hook up to the grid."

15 I mean, here we have towns that are not
16 connected but effectively it's the same sort of issue.
17 We look at the population forecast. We look at how
18 many houses people have to live in. We don't exactly
19 ask where they are. We just say there is a certain
20 electricity requirement associated with having so many
21 people in Ontario earning such and such incomes and so
22 on, and that leads to a forecast for provincial
23 electricity demand.

24 And so in that context, the exclusion of
25 some communities from the forecast I don't think makes

1 a material difference to the provincial load forecast.

2 Q. But you don't really know what the
3 populations are in those communities?

4 A. I know that they probably are not
5 much more than 25 year-round customers or they probably
6 would already be on the system, but I can't be sure of
7 that. I know that that is the minimum requirement for
8 town service and this picture refers to communities
9 having at least 10 year-round household, so it is not
10 clear that they would currently qualify under the
11 current rules for the remote community system.

12 But if the entire remote system which
13 probably includes the largest communities is two
14 one-hundredths of a per cent of our total electricity
15 demand, I think that we are talking about some very
16 small numbers in proportion for provincial-wide
17 planning purposes. There may be significant impacts
18 locally. That's a different question.

19 But if we are talking about the
20 provincial load forecast, I don't think the loads in
21 those communities are going to make a significant
22 difference.

23
24 ...
25

1 [12:58 p.m.] Q. Mr. Rothman, you look at population
2 data in the StatsCan data base. Would you agree with
3 me that the population figures for the remote
4 communities aren't very accurate?

5 MR. ROTHMAN: A. I don't know. We,
6 again, have not looked specifically at those forecasts.
7 Like Mr. Burke, we don't look at specific communities
8 or urban areas within Ontario for our aggregate
9 population forecasts.

10 Q. That's not what I am asking you,
11 though. For your aggregate population forecast, you go
12 to the StatsCan data base, and in that StatsCan data
13 base, there is some data about reserves. If you can
14 turn with me just to Interrogatory 1.10.7. I am going
15 out of order here a bit.

16 This will be later on in your package,
17 Board.

18 THE CHAIRMAN: .7?

19 MS. KLEER: Yes, 1.10.7.

20 Q. Attached to that answer is a page out
21 of the census, Statistics Canada census for 1986, and
22 one of the headings is "Incompletely Enumerated Indian
23 Reserves and Indian Settlements."

24 "On some Indian reserves," it states,
25 "and Indian settlements in the 1986

1 census, enumeration was not permitted or
2 was interrupted before it could be
3 completed. Data for 1986 are therefore
4 not available for the incompletely
5 enumerated reserves and settlements and
6 are not included in tabulations."

7 And then it goes on.

8 You would have to agree with me, Mr.

9 Rothman, that to the extent that the StatsCan data base
10 doesn't include or has an incomplete enumeration, your
11 population forecast or figures are going to be slightly
12 off.

13 MR. ROTHMAN: A. Yes. StatsCan has been
14 unable to fully enumerate certain First Nation
15 communities, and, as a result, they don't have complete
16 data for those communities as this statement suggests.

17 Q. Well, I guess my question then is,
18 Mr. Burke, you stated that you don't think it's going
19 to make much of a difference to basic load forecast, or
20 to the primary load forecast for that matter, as to
21 whether or not these communities are in or out over the
22 next 25 years. Do you really have an adequate data
23 base from which to make that assumption or
24 determination?

25 MR. BURKE: A. We have been discussing

1 uncertainties in the basic load forecasts of plus or
2 minus about 20 per cent in the long term, and we are
3 talking here of about a load of two one-hundredths of a
4 per cent of the system. From the point of view of the
5 total for Ontario, which strikes me as not really the
6 issue that you are addressing, but if it is, I am
7 certainly adamant that it will not make a significant
8 difference to our load forecast for Ontario.

9 Q. It will make some difference, though?

10 A. A totally unmeasurable and very small
11 and relative to general uncertainties.

12 MR. ROTHMAN: A. StatsCan itself points
13 out while for higher level geographic areas, Canada
14 provinces census metropolitan areas and census
15 conglomerations, the impact of the missing data is very
16 small. The data here are well less than rounding error
17 for the kinds of data that we are talking about when we
18 make these forecasts.

19 MS. KLEER: It might be an appropriate
20 time to break now.

21 THE CHAIRMAN: All right. Break until
22 2:30.

23 THE REGISTRAR: The hearing will adjourn
24 until 2:30.

25 ---Luncheon recess at 1:01 p.m.

1 ---On resuming at 2:30 p.m.

2 THE REGISTRAR: Please come to order.

3 This hearing is again in session. Please be seated.

4 MS. KLEER: Mr. Chairman, it is my fond
5 hope that I will be finished in an hour from now, so I
6 shall target for that.

7 Q. Mr. Burke, I just have one sort of
8 clarification question arising out of this morning's
9 questions.

10 Is it your opinion that the energy
11 demands for what are now remote communities serviced by
12 Ontario Hydro and serviced largely by diesel generators
13 would not be any different than if they were to be
14 connected up to the bulk electricity system?

15 MR. BURKE: A. As far as I can see, the
16 only implication for the demand for electricity that
17 the system feeds back to the load forecast is through
18 the cost of power, and given that the same costs would
19 apply, whether the source was the grid or a local
20 diesel generator, then I don't see why the demand for
21 electricity would differ.

22 Q. Okay. And then in making that, in
23 stating that opinion then, you have to be assuming, do
24 you not, that the diesel generation system that
25 services a remote community is fully capable of meeting

1 their energy needs?

2 A. Well, I think when we got to this
3 point last time, I said that I couldn't speak for the
4 capacity of the local generation. You were asking
5 about the demand for electricity and the demand for
6 electricity is quite independent of how it's supplied.
7 There is either demand or there isn't. And the price
8 is not varying whether or not there is a supply
9 constraint. So we are trying to estimate demand and
10 the planners will have to deal with the supply side or
11 through demand management programs or whatever.

12 Q. If the community has a diesel
13 generation system and it only produces X amount of
14 terawatthours, I mean that's the maximum capacity that
15 that diesel generator can produce, wouldn't you agree
16 or isn't it possible, at any rate, that the customers
17 providing their forecasts or what they expect to need
18 are going to in some way be limited because they know
19 that there diesel generation system will only produce X
20 amount of power?

21 A. Well, I don't think that is a
22 judgment I should make, but I would expect that there
23 must be flexibility to expand these local systems. And
24 I would think, if you want to ask me about the demand
25 for electricity, my considerations are independent of

1 whether or not a local diesel generator's capacity can
2 be increased or altered.

3 Q. Okay.

4 DR. CONNELL: Could I just make one point
5 for clarification?

6 Do you consider reliability to be a
7 factor bearing on this point? If there were any
8 difference in reliability - and I am not sure that
9 there would be - would that be a factor that would
10 affect demand?

11 MR. BURKE: Well, I must admit, I don't
12 know whether the existing diesel system is unreliable
13 and therefore I can't really speak to whether the
14 reliability would change for that community and whether
15 that would then result in more demand for power. It
16 could be, but I really don't know how those two
17 compare.

18 MS. KLEER: Q. Is it fair to say, Mr.
19 Burke, that the load forecast department is not aware
20 of any overall Ontario Hydro strategy for supplying
21 energy needs of remote communities, whether that be
22 hooking them up to the grid or by supplying them
23 through diesel or through some other local supply
24 options? Is there any such overall strategy that you
25 are aware of?

1 MR. B. CAMPBELL: Is this other than the
2 document that was filed, other than that program?

3 MS. KLEER: Other than the document
4 filed, yes.

5 Q. I am just asking, that may be the
6 strategy. I am asking whether or not there is anything
7 else that you are aware of.

8 MR. BURKE: A. No.

9 Q. And is it fair to say, if we turn to
10 Interrogatory 2.10.6, and I appreciate that you didn't
11 provide this answer, but it is Ontario Hydro's answer.
12 If you look at the second paragraph of that response,
13 it says:

14 "While the DSP did not explicitly
15 consider the supply of electricity to
16 remote communities, the development of
17 some options and associated transmission
18 could entail a change in the status of
19 some communities with respect to their
20 integration into the BES. Such
21 considerations, being site-specific in
22 nature, would be considered at the
23 project specific stage."

24 Now, when I read that answer, Mr. Burke,
25 it seems to me that it implies that there is no overall

1 strategy and that in fact whether or not a community
2 is going to be --

3 THE CHAIRMAN: Could you hold for a
4 minute, please, while we get it?

5 MS. KLEER: 2.10.6.

6 THE CHAIRMAN: That's the second
7 paragraph, is that right?

8 MS. KLEER: That's correct.

9 THE CHAIRMAN: Just hold it a second.

10 MS. KLEER: This should be fairly early
11 on in the package of interrogatory responses.

12 THE CHAIRMAN: Now, would you mind asking
13 your question again?

14 MS. KLEER: Q. I had just read out that
15 answer, the second part of the answer, and my question
16 was: If you read that answer, doesn't it seem that
17 rather than there being an overall strategy, as just
18 now to the question of electrification, i.e.,
19 connecting a community up to the grid, there is no real
20 overall strategy; it's dealt with on a site-specific
21 basis.

22 MR. B. CAMPBELL: He said there is no
23 strategy of which he is aware of. I don't think there
24 is any basis for him now to go on and express any view
25 of the matter. He said he is not aware of a strategy

1 other than that approach that is outlined in the
2 process document. I believe this has been pursued as
3 far with this panel as it is possible to.

4 MS. KLEER: If I might respond. My
5 question, I appreciate that he said he is not aware. I
6 am just trying to elicit from this witness whether
7 Ontario Hydro in general has no strategy, and perhaps
8 this questions is best directed to someone in Panel 2.

9 THE CHAIRMAN: He said he is not aware of
10 it, so I don't suppose he can say much more than that.

11 MS. KLEER: All right, then I withdraw my
12 question.

13 Q. If we can turn briefly to the Remote
14 Community Energy Supply Procedural Document, which is
15 the last exhibit that was filed, and I believe, Mr.
16 Burke, that you have extracts or do you have the entire
17 document in front of you?

18 THE CHAIRMAN: Just a moment now, we will
19 just get that, too.

20 MS. KLEER: Q. Mr. Burke, do you have
21 that document?

22 MR. BURKE: A. Yes, I do.

23 Q. It's the actual document.

24 THE CHAIRMAN: Is that the orange-
25 coloured...

1 MS. KLEER: The orange-coloured document.

2 THE CHAIRMAN: "Design and Development
3 Division - Generation"?

4 MS. KLEER: That one, that's right. And
5 if you turn to the first page it's entitled "Remote
6 Community Energy Supply Procedural Document."

7 THE CHAIRMAN: Just one moment.

8 MS. KLEER: I am going to be referring to
9 page 3.

10 THE CHAIRMAN: Where are we at?

11 MS. KLEER: We are at page 3 of that
12 document, under the section entitled "Overview of
13 Remote Community Electrification Facilities."

14 Q. Mr. Rothman, since you haven't
15 answered many questions, I will ask you this question.
16 For the purposes of this document, this page -- I am
17 just reading from page 3 here.

18 "For the purposes this document,
19 remote communities are defined as
20 communities which must be supplied with
21 dedicated or isolated generation and is
22 not practical to incorporate into Ontario
23 Hydro's electrical and transmission
24 distribution grid."

25 Would you agree with me, Mr. Rothman,

1 that the question of practicality of incorporation
2 should include a consideration of the economics of
3 connecting them up? Do you think that would be part of
4 what practicality includes or should include?

5 MR. ROTHMAN: A. I think that would be
6 part of practicality, yes.

7 Q. Is the economics and forecast
8 division ever consulted by the remote community
9 electricity supply system to assist them in determining
10 whether to incorporate a community into the grid?

11 A. This corporation uses economic
12 analysis, the words "economics analysis" in several
13 ways, one of them is in the terms of a cost benefit
14 analysis or present worth -- not cost benefit. A
15 financial analysis of a particular investment and
16 that's the sense in which I thought you were using that
17 term. That is, not a kind of analysis about which we
18 were are typically consulted except for the use of the
19 corporate financial discount rate, and it's the sense
20 in which I answered that question.

21 So the short answer to your question is
22 no, we have not been consulted about those analyses,
23 and basically I don't think that we have much to offer
24 because the question is what are the costs of
25 particular actions, and we don't have any more or

1 better information on those costs than would the people
2 in that part of the planning side or operating side of
3 the corporation that's doing the analysis.

4 Q. Just generally, what kind of
5 communications, and perhaps this question should go to
6 you, Mr. Burke, in the light of fact now that your 1990
7 load forecast incorporates remote communities
8 forecasts, what kind of discussions do you have with
9 the RCES? Is it division or a branch?

10 MR. BURKE: A. One second. It's
11 certainly not a division or a branch. It's part of the
12 northwestern region division.

13 Q. Okay.

14 A. I think the regions are sort of
15 treated as divisions functionally.

16 We interface with them to the extent that
17 we arrange to receive the forecasts that they collect.
18 The forecast was something that they were collecting
19 for their own purposes and now that we are required for
20 revenue requirement purposes to have the remote system
21 load as part of our customer forecast system, we just
22 receive the forecasts from them.

23 Q. That's basically the extent then of
24 your discussion with them?

25 A. Yes.

1 We have asked them questions about the
2 forecast, especially in the course of preparing
3 interrogatory responses. But in general, the
4 relationship we have with the regions is that they are
5 a supplier to us of customer information.

6 Q. So then I take it you haven't
7 consulted with them to determine what their
8 expectations would be in the next 25 years about the
9 prospects of electrification, i.e., connecting up to
10 the grid of some of these communities, and then the
11 second part of the question, if you did, or if you had
12 those discussions, would they have any impact on your
13 basic load forecast?

14 A. I think I have already indicated the
15 answer to those questions. Whether they are connected
16 to the grid or not does not bear, as far as I can see,
17 on the forecast of demand in those communities given
18 that the prices are harmonized. There is the issue Dr.
19 Connell raised and that's qualitative consideration in
20 the sense that I don't know how that would adjust the
21 forecast. And there may be other things that emerge on
22 closer scrutiny, but broadly speaking, I wouldn't
23 expect that it would make a difference.

24 Q. All right. I am just trying to
25 understand now in the 1988 basic load forecast. You

1 didn't incorporate remotes I understand. Now, can you
2 tell me, was there ever a decision made to not
3 incorporate them in 1988 forecast and in previous
4 forecasts? Was that something that you played a part
5 in?

6 A. No. Again, I think we have discussed
7 this. Prior to to 1989, before the rate structure
8 changed, the remote community electrical system was
9 planned independently and was costed independently, and
10 our job was to produce the load forecast for the bulk
11 electric system and we did that. And now that the
12 costs of the remote system are rolled in with the costs
13 of the bulk electric system, that's why we have made
14 the change. I think we have covered that ground
15 before.

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1 [2:37 p.m.] Q. All right. Okay. That's fine.

2 Let's look at Interrogatory 1.10.10.

3 THE CHAIRMAN: 1.10 point... ?

4 MS. KLEER: 10. That should follow after
5 1.10.2, and a series of tables.

6 Q. Mr. Burke, am I to understand from
7 this answer that Ontario Hydro does not have any
8 reliable data on energy use by First Nation
9 communities? That's the second sentence in that
10 answer.

11 MR. BURKE: A. That's correct. And it
12 is a specific answer to a specific question in the
13 sense that we obviously have data about electricity use
14 in remote communities, but First Nation communities
15 span both part of the remote system and part of the
16 on-grid system and perhaps even communities that are
17 not -- there is energy use in communities not served by
18 Ontario Hydro at all. In that sense we do not have
19 data.

20 Q. Now, I think you referred to this
21 indirectly in some of your previous answers. In
22 Interrogatory 1.10.21, which should be the next one in
23 in the package that the Board has in front of it, do
24 you, Mr. Burke, have any knowledge as to what extent
25 the electricity usage in remote communities, which is

1 now 320 kilowatthours per month as compared to an
2 average 1450 kilowatthours per month, represents an
3 under-estimation of the potential load over the coming
4 25-year period?

5 I understand you have talked now about
6 the five-year forecast which shows it doubling. Is
7 there anything beyond the five-year?

8 A. First of all, let me say that by the
9 time we look at a long-term forecast, there are some
10 components of that forecast that are going strongly and
11 some components that are not going at all, could be
12 declining. So that what we have is an average growth
13 rate for the total system. We have that broken out by
14 end use, by sector, and so on, but we don't have it for
15 the remote system.

16 And it is very difficult for me to say
17 whether somehow our total forecast is understated
18 because of the implicit as opposed to explicit
19 treatment of the remote system.

20 Q. And I take it then you would give the
21 same sort of response to the question of what impact
22 the removal of the amperage restriction would have on
23 your load forecast?

24 A. That's a question which I couldn't
25 answer, but I presume was taken into account when the

1 customers prepared their own forecast for us this year.
2 After all, the amperage restriction was removed early
3 in '89, so that they would have had a chance to think
4 about it in preparing the forecast for the first five
5 years.

6 Q. Well, I just want to question that.
7 Is it fair to say that if people have low cash incomes,
8 and they have few appliances and don't have access to
9 markets to buy things like jacuzzis and PCs, and
10 perhaps they don't even want to, it doesn't matter to
11 them, that it is quite possible that removal of an
12 amperage restriction and changing the rate structure
13 would have very little impact at all on electricity
14 demand?

15 A. Certainly it is possible but --

16 Q. You simply don't know though because
17 you don't collect and know about what is happening in
18 First Nation communities on a community-by-community
19 basis --

20 A. I think I have just described that we
21 get a forecast from the communities and they discuss it
22 with the manager of - it's good to have the right
23 name - the Remote Community Electricity System, that it
24 is their forecast which is roughly doubling over the
25 next five years.

1 Q. All right then. Your are sort of
2 accepting their forecast though? Basically you have
3 to.

4 A. That is what we have done and I have
5 already said that I haven't really analyzed their
6 forecast to see whether I would agree with it in this
7 case.

8 Q. If we can turn to Interrogatory
9 1.10.24. Again I take it from your answer that it is
10 quite simply Ontario Hydro has made no assumptions
11 about available level of service when it put together
12 its load forecast; is that correct?

13 A. That's correct.

14 Q. You would agree that available level
15 of service would affect energy consumption levels; is
16 that fair to say?

17 A. I suppose in some way that, you know,
18 we would have to study the specific circumstances.

19 Q. Generally speaking though, available
20 level of service is going to have some -- if your
21 available level service is very low --

22 A. Yes, but it really comes down to: Is
23 it a binding constraint or isn't it? Is it restricting
24 the amount of electricity or is it a situation like you
25 have just postulated where really if you took it away

1 it wouldn't make any difference. You would have to
2 check that out.

3 Q. You would say now, though, you simply
4 don't know whether available level of service is
5 constrained or not on the amount of energy that is
6 being consumed?

7 A. That's correct. But it works both
8 ways. If someone is forecasting demand, it probably
9 hasn't -- it matters whether historically there was a
10 binding constraint. If it wasn't a binding constraint
11 historically, then perhaps the forecast is premised on
12 a continuing situation like that; that is, that it
13 isn't constrained, and it might become constrained, one
14 might bump into a limit, but the forecast wouldn't know
15 that. It is being premised on the idea that service
16 levels didn't constrain demand. You really have to
17 look at it in a specific situation.

18 Q. You haven't done that?

19 A. No, we haven't done that.

20 Q. This is another hypothetical. Did
21 you address or think about in developing your load
22 forecast that load in remote communities would increase
23 so dramatically over the next 25 years that they would
24 outgrow their diesel generator capacity and therefore
25 seek to be hooked up to the bulk electricity system?

1 A. Well, it sounds to me like a very
2 similar question you asked me a few minutes ago.

3 Q. You haven't taken --

4 A. It doesn't impinge on the load
5 forecast.

6 Q. All right.

7 Does your department have any discussions
8 with the Ontario Native Affairs Directorate as to
9 energy directions that might -- or energy changes that
10 might be happening in First Nation communities?

11 A. Well, I believe we have been in
12 contact with them but I don't know that it is sort of a
13 systematic process of informing our judgment about the
14 load forecasts to be applied to First Nations because
15 as we have indicated we really don't separate out First
16 Nations; we separate out remote system from on-grid and
17 for the remote system, we have been quite clear of the
18 extent to which we actually have done analysis above
19 and beyond what the customers have given us and it has
20 not been very much at all, so far.

21 Q. What I am trying to understand is, I
22 understand from Dr. Buja-Bijunas' evidence that you go
23 directly to the industrial sector and you ask them
24 questions about, are they moving towards using electric
25 arc furnaces and how will that affect your forecast.

1 What I want to know is do you see that
2 there might be some problem or something that you
3 missed in your forecast because you don't go to First
4 Nation communities and try and determine from them are
5 there going to be any changes in the next 25 years that
6 we should know about?

7 MR. B. CAMPBELL: Just so I am clear. I
8 am a little worried about what this is going to look
9 like in the transcript. The "you" that have been
10 talking about and the "we" being given in the answers,
11 so we are all clear is the load forecast department of
12 Hydro not the corporation and all its different
13 departments. Are we all talking the same language
14 here?

15 MS. KLEER: It is the load forecast
16 department I am talking about.

17 MR. B. CAMPBELL: All right. Thank you.

18 MR. BURKE: My understanding is that the
19 remote -- are we talking the remote system now or are
20 we talking --

21 MS. KLEER: Q. No, I am talking about
22 First Nations, which includes both remotes and on-grid.

23 MR. BURKE: A. It includes part of
24 remotes and part of on-grid, right, is that a fair
25 statement.

1 Q. That's right.

2 A. We don't ask any community, we don't
3 pursue any community in Ontario for information
4 categorized in the same way as First Nations; that is,
5 we don't particularly find out information about a
6 religious community who happens to live in one part of
7 the province. That's not one of the categories we
8 particularly subdivide our analysis by.

9 And so it's not that we don't seek
10 information about First Nations; we don't seek
11 information about any group of people, even a
12 particular town, we wouldn't particularly seek
13 information about people living in a certain town.
14 Essentially, if they are captured by the municipal
15 utility or part of the rural retail system or something
16 like that, then they are captured. But it is not a
17 question that we seek to do a load forecast in that
18 way.

19 Q. Do you have any idea as to whether or
20 not a First Nation community functions on a different
21 basis, i.e., that they produce -- rather than having an
22 industry move in, that the community decides that they
23 want to set up a sawmill, a local sawmill or something
24 like that. Is that something you are aware of or you
25 would agree to?

1 A. Well, I guess my problem is that I am
2 not producing a forecast of First Nations. I am
3 producing a forecast for Ontario and I produce a
4 forecast for the customers of Ontario Hydro aggregated
5 in certain ways such as we are a wholesaler to the
6 municipal utilities. We have a rural retail system
7 which we divide up into 50 area offices and we have
8 direct industrial customers and we produce forecasts
9 for load purchased in that particular categorization.

10 And within the rural retail system in
11 municipal utilities, there is a wide diversity of
12 people with different uses and different ways of doing
13 things. And we don't particularly investigate the
14 usage patterns for particular communities. We look at
15 the customers essentially. Or we look for the end-use
16 analysis, broadly speaking, across the province, at
17 lighting or space heating or refrigeration and so on.
18 But we haven't particularly found it useful, or I'm not
19 even sure whether it would be feasible, to try to
20 forecast load on the basis of particular sort of
21 communities of the Ontario public that...

22 Q. All right. But then it is fair to
23 say then that in your basic load forecast and in your
24 primary load forecast, you are assuming as sort of a
25 basic assumption that you need not have a

1 community-based forecast and that somehow the way you
2 do your forecasting, whether it uses the end-use
3 methodology or econometric model, it is going to
4 capture trends.

5 A. I think this is why I've been
6 wondering sometimes whether you have been asking the
7 right questions. In aggregate, the aggregate averages
8 over a wide range of different lifestyles, different
9 income levels, different choices. And yes, we are
10 comfortable that in aggregate we have a reasonable load
11 forecast.

12 We just don't have certain kinds of
13 information. That doesn't necessarily, I think, bring
14 the aggregate into question. We have covered all of
15 Ontario load one way or another several times with
16 different ways of analyzing load. We haven't
17 particularly sliced it up the way you are suggesting,
18 but that doesn't mean that somehow somebody got left
19 out.

20 Q. But you don't know whether or not a
21 First Nation community decides differently as to how to
22 to work towards an economic development scheme. They
23 don't set up a steel industry in their community but
24 they might set up another industry which is a more
25 local smaller industry. What I am wondering is whether

1 or not in your opinion your load forecast captures that
2 kind of a possibility?

3 A. I think if I was forecasting First
4 Nations' load, then I would have to say -- I would have
5 had to have analyzed the sort of questions that you are
6 asking me. But I am not forecasting First Nations'
7 load.

8 Q. Okay.

9 A. I am forecasting load either
10 graphically by customer, by end use, by broad sector,
11 but I happen not to be forecasting it for First Nations
12 and other equivalent communities across the province;
13 and, therefore, the particular decision-making
14 characteristics of that community don't really bear on
15 the forecast we produce.

16 Q. Have you made any enquiries as to
17 whether or not the economic development initiatives
18 that are taking place in First Nation communities will
19 have any impact on your load forecast?

20 A. Well, again, for the province as a
21 whole it is a very aggregate forecast. We have a
22 forecast of economic activity in Ontario which is
23 designed to capture all of the economic activities in
24 Ontario. And if the economic development of First
25 Nations is going on in Ontario, then it's implicit in

1 our forecast.

2 Certainly, government spending is part of
3 the forecast for GDP regardless of whether it occurs in
4 a First Nations' community or some other community
5 spending contributes to stimulating the Ontario
6 economy, at least we presume it will, and is captured
7 in the GDP forecast which drives the load forecast.

8 Q. Mr. Rothman, in your evidence you
9 talked about risks to the forecast, and I just wanted
10 to know how it is that you came to identify the
11 political risks to the forecast that you talked about
12 in your direct evidence. You picked Free Trade
13 Agreement and monetary policy and Quebec leaving Canada
14 as some examples. How do you decide what to choose as
15 being risks to the forecast?

16 MR. ROTHMAN: A. We try to find events
17 policy decisions that in the medium term could be
18 identified and could have major long-term implications
19 for the Ontario economy. So it's a pretty subjective
20 process. And you can tell from that list of identified
21 risks that it is affected by our current interests at
22 the time that we make the forecast. What kinds of
23 things are being talked about in the business press or
24 in the popular press, what kinds of issues are
25 important currently.

In addition, though, we do try to look at what we think are the most important long-term risks in, for example, government policy. That's why we have identified the risk of a looser or a fluctuating monetary policy as one of the risks.

• • •

1 [3:10 p.m.] That is not one that's talked about in
2 the popular press but that's one that we identified
3 because it's a policy mistake that governments have
4 made before. It's a policy mistake that could be very
5 tempting given current conditions of aggregate debt
6 levels for governments to fall into, and it's a policy
7 mistake that could have serious consequences for the
8 long-term forecast.

9 Q. Did you, in choosing those political
10 risks that you chose to incorporate into your forecast,
11 did you give any consideration at all to what the role
12 of native self-government initiatives might have on
13 your forecast?

14 A. No.

15 Q. Did you treat that as risk, though?

16 A. No.

17 We are looking for events that could have
18 major impacts on total Ontario GDP, and that isn't what
19 I would identify, even having identified it, it isn't
20 what I would identify as having a risk of potential
21 major impact on Ontario GDP. And when I talk about
22 major, I am talking about effects on the order of two
23 or three per cent of Ontario GDP at least, over at
24 least, say, a 10-year period.

25 That's not to say that it couldn't have a

1 significant effect both within those First Nation
2 communities and in aggregate, if that were aggregated
3 across all the First Nation communities. But I don't
4 think it's likely to be of that order, the order of
5 magnitude that I first identified.

6 Q. Just a point of interest. When I
7 went back and I looked at your '88 and '89 load
8 forecasts to the section that talked about risks to the
9 forecast, I didn't see any discussion there of the
10 political risks that you talked about in your direct
11 evidence. I can point to you the pages, but is it that
12 fair to say that your load forecasts don't identify in
13 writing to the political risks that you talked about?

14 A. As I said, which risks get identified
15 do vary from forecast to forecast, depending on which
16 are seen as risks at the time. The place where those
17 risks would be identified would be in the long-term
18 economic outlooks rather than in the load forecast.

19 Q. If we look at 1988 load forecast for
20 a moment, Exhibit 7, at page 27, there is a section
21 entitled "Risks to the Forecast." Do you have that in
22 front of you, Mr. Rothman?

23 A. Yes, I do.

24 Q. Now, when I review that page in that
25 section I don't see any discussion there of any

1 political risks of the kind that you talked about in
2 your evidence.

3 A. No, they would be included under the
4 risk of variations in the rate of real economic growth.

5 Q. Okay. All right. So it's that more
6 general categorization.

7 I guess what I really want to get at,
8 this load forecast is ultimately used by your system
9 planners and what kind of discussions do you have with
10 them based upon both your written documentations and
11 orally about these political risks to the forecasts and
12 what they might anticipate?

13 A. I think that they use the load
14 forecast bandwidth as their primary information about
15 uncertainty in the load forecast. And I don't think
16 that they have been interested, recently anyway, in
17 what kinds of driving factors are producing that
18 uncertainty in the future. That is whether they are
19 risks to the economic forecast or risks to the level of
20 energy intensity, or the other kinds of risks that are
21 identified in the document you just quoted. So we
22 haven't recently had those kinds of discussions.

23 At one time, as I think we talked about,
24 we produced alternate scenarios and those scenarios
25 effectively identified a triggering event or policy

1 decision, and then a set of coherent forecast variables
2 flowing from that event or policy decision.

3 Effectively, as I said, those were
4 alternative forecasts. We made those available to the
5 planners and they at one time found them somewhat
6 useful but ultimately they discovered that they really
7 needed a variable where they could quantify
8 uncertainty, quantify probability, and those
9 alternative scenarios are -- well, I was going to say
10 inherently unquantifiable, the probabilities are
11 inherently unquantifiable.

12 We did put forecast probabilities on them
13 but they were very subjective probabilities, and it was
14 not clear to us or to the planners what the
15 probabilities were describing.

16 The problem is, as we have said
17 throughout these hearings, the probability of the
18 scenario itself, the particular path described by the
19 scenario, is zero. So to ascribe some probability we
20 have to be implicitly ascribing it to some range around
21 the scenario and we produced four scenarios. The
22 problem was that we had a lot of difficulty defining
23 where the end of the range of one scenario was and the
24 beginning of the range for the next scenario.

25 Q. All right. I think that exhausts my

1 questions on the risks to the forecast.

2 Mr. Burke, you have told us now, and I
3 believe that's also contained in Interrogatory 1.10.15,
4 which is in the package that the Board has, it should
5 be a little later in the package. This is just to have
6 it on the record. 1.10.15 and also your evidence
7 confirms that in 1990 the basic load forecast was
8 altered so as to include the remote First Nations, and
9 of course you would agree with that?

10 MR. BURKE: A. Yes.

11 Q. Now, doesn't it seem slightly
12 inconsistent to you to include in your basic load
13 forecast the remote communities when in fact the basic
14 load forecast is used to plan for the bulk electricity
15 system?

16 MR. B. CAMPBELL: Just a minute. The
17 planning side of this, Mr. Chairman, again is going to
18 be spoken of by a later panel who produced this
19 forecast. The planners will speak to how they use it
20 for planning purposes and there are two distinct
21 planning mechanisms in place.

22 THE CHAIRMAN: I think it is all right
23 for these witnesses to be asked, do they think it's
24 inconsistent to include the whole of Ontario in their
25 forecast when they are only planning for the basic

1 system. Is that the question?

2 MS. KLEER: That's the question.

3 THE CHAIRMAN: If they can answer, they
4 can answer.

5 MS. KLEER: Q. Can you answer that
6 question, Mr. Burke?

7 MR. BURKE: A. Well, I would think that
8 if a plan was being prepared now, knowing that we have
9 included the load associated with the remote
10 communities in the basic load forecast, that the
11 planners would have to take that into account when they
12 plan the on-grid system.

13 Just by way of analogy, we have an west
14 system and an east system and we provide the total, but
15 they certainly disaggregate it for planning purposes --
16 but rather, we disaggregate it for planning purposes.
17 It is available by different systems and so on.

18 Q. Now, just a minor detail. In the
19 1988 load forecast, according to Interrogatory 1.10.7,
20 you include as one of your main driving variables for
21 the residential sector housing stock. And we asked the
22 question in 1.10.7 whether additions to housing stock
23 included additions to housing stock on reserves, and if
24 I interrupt your question correctly, it says, yes,
25 however imperfectly, our housing stock forecast

1 included additions to housing stock on reserves. Is
2 that correct, Mr. Rothman?

3 MR. ROTHMAN: A. Yes. We are back to
4 the matters we discussed earlier, that there is an
5 incomplete census on the reserves and therefore
6 incomplete count of housing stock.

7 Q. I guess my question is, of in 1988
8 you produced a load forecast that didn't include
9 remotes, to the extent that you included housing data
10 for reserves that were remote, you would have slightly
11 over-forecast on housing stock and then thus affected
12 your outcome on your load forecast?

13 A. Yes, that's possible. But since the
14 entire remote system, as Mr. Burke has pointed out, is
15 two-hundredths of a per cent, to the extent that there
16 is some count of housing stock that would be included
17 on the remote system but not included in the forecast,
18 the error would be very small.

19 Q. I guess the same question applies to
20 the next interrogatory, which is 1.10.8. You also
21 include building stock in your analysis of energy use
22 for the commercial sector and we ask whether or not the
23 forecast for building in stock includes buildings on
24 reserves. And the again the answer was: Ontario Hydro
25 does include buildings on reserves in its forecast for

1 building stock and does not forecast them separately.

2 So again, in 1988, to the extent had you
3 included building stock from reserves that were remote,
4 your forecast would be slightly off?

5 A. That's correct.

6 Q. And it is simply not worth it to you
7 to try and change or adjust your forecast in 1988 at
8 any rate, to have taken out those numbers?

9 A. To be truthful, it wasn't an issue
10 that arose. But in any case, I don't know that it
11 would have been possible because of the -- I don't know
12 for sure that it would have been possible.

13 My guess is would have been impossible
14 even if we tried to do because of Statistic Canada's
15 confidentiality principles. And Statistics Canada
16 doesn't make available data disaggregated enough to be
17 able to idea specific respondents to their surveys, and
18 I think that at this level, we would be getting very
19 disaggregated. So that I am not sure that we could
20 have the data available, that's first consideration.

21 The second consideration is, especially
22 in the residential sector, as we have already said,
23 there is an incomplete survey in the Statistics Canada
24 data. So that, presumably, there are some residences
25 on reserves or in First Nation communities that are not

1 counted in the Statistics Canada surveys but that may
2 be on the grid. So, to that extent, we would be the
3 other way. We would have housing stock that's on the
4 grid but not counted in the total housing stock data.

5 Q. But you simply don't know one way or
6 the other because of the way the data --

7 A. We don't know one way other the
8 other, and my guess is even if we tried we couldn't
9 find out. And it would be a costly exercise for a very
10 small increase in accuracy of the historical data base.
11 Given the reliability of these historical data bases,
12 it would really not be a visible improvement in their
13 quality.

14 Q. I just want to go quite quickly
15 through a number of the following interrogatories just
16 to basically put them on the record.

17 Interrogatory 1.10.3, it should be the
18 next in the Board's package. Ontario Hydro's
19 description of electricity growth in the residential
20 sector may or may not pertain to customers in native
21 communities. Is that the upshot of that response, in
22 1.10.3? And perhaps, Mr. Burke, it's fine if you
23 answer these questions.

24 The question is, basically, I am looking
25 at the bottom line. The data, i.e., the data on

1 electricity growth in residential sector do not
2 distinguish by Indian and non-Indian nor by any special
3 reference, meaning it's not possible to know whether
4 the customer is a member of the community specified?

5 THE CHAIRMAN: I think he answered that,
6 didn't he, in earlier statements? He said they don't
7 make distinctions of that nature; they just simply get
8 the information from the area, the forecast, but they
9 don't make any distinction between Aboriginal or
10 non-Aboriginal.

11 MS. KLEER: I appreciate that. I just
12 want to get it clearly on the road that that's in fact
13 the case.

14 MR. BURKE: Yes.

15 MS. KLEER: Q. Just looking at the next
16 one, 1.10.4 and 1.10.22. Now again, Mr. Burke,
17 according to these responses, you would agree that
18 Ontario Hydro doesn't know to what extent First Nations
19 are currently using oil for space heating or water
20 heating?

21 MR. BURKE: A. Yes, that's correct.

22 Q. And for 1.10.5, again you don't know
23 customer use patterns for native communities on-grid or
24 for those that are off-grid?

25 A. Yes, that's correct.

1 Q. And for 1.10.17, Ontario Hydro has
2 never undertaken any studies of First Nation customer
3 end-use patterns either on- or off-grid?

4 A. Yes. I might add we haven't
5 undertaken any other town problems either.

6 Q. I appreciate that.

7 Dr. Buja-Bijunas, the next interrogatory,
8 1.10.19, if you turn that up. Is it fair to say,
9 looking at this response, that Ontario Hydro has no
10 idea for the residential sector on reserves as to what
11 percentage of electricity goes to running appliances,
12 is simply because the appliance survey that's used by
13 StatsCan doesn't include households on reserve?

14 DR. BUJA-BIJUNAS: A. That is correct,
15 it does not.

16 Q. Has system planning ever come to the
17 load forecast department and asked them to produce
18 disaggregated data on First Nations so as to permit
19 them to look at developing localized energy supply
20 options; is that anything they have ever approached you
21 about?

22 MR. BURKE: A. Not to my knowledge, no.

23 Q. My last question, then, relates to
24 Interrogatory 1.10.10, and that should be -- for the
25 Board, you should have two separate pages.

1 [3:30 p.m.] A. That's correct.

2 Q. Is it fair to say that you really
3 know nothing about whether your judgments about trends
4 in values and lifestyles and activities that we have
5 heard a lot of evidence about, things like purchasing
6 jacuzzis, getting larger appliances, getting a home
7 fax, that those trends may have nothing at all to do
8 with what's going on in aboriginal communities?

9 A. It's also possible that they may have
10 nothing to do with what's going on in 90 per cent of
11 Ontario. It's not simply a function of aboriginal
12 communities and non-aboriginal communities. The
13 portion of the population that has faxes and home
14 computers and that sort of thing is far from a hundred
15 per cent in the non-aboriginal community.

16 These are characteristics of some of the
17 people of Ontario, and there are some of the people of
18 Ontario who do not share -- well, purchase those kinds
19 of goods. I am not sure that it's being useful for us
20 to make a distinction between whether it's First
21 Nations or non-First Nations who do not purchase or do
22 purchase certain kinds of equipment. We are really
23 just trying to get an estimate of in total who does and
24 who doesn't and what the trends are.

25 And the distinction has not being a

1 material one because no one has asked particularly to
2 have a forecast of First Nations' electricity use. It
3 is of interest to us to know geographically where
4 people consume electricity and so we have a forecast
5 for electricity demand for the remote system, for the
6 bulk electricity system, and within that by region and
7 by customer class and so on.

8 But I guess what I am trying to emphasize
9 is that this sort of knowledge is not something that
10 particularly distinguishes between First Nations and
11 non-First Nations. We don't know exactly who is buying
12 the faxes. And it really doesn't matter from the
13 perspective of projecting Ontario load over the next 25
14 years.

15 Q. But it may matter to other people.

16 A. Yes.

17 MS. KLEER: Those are my questions.

18 THE CHAIRMAN: Thank you.

19 Ms. Marlatt, are you next?

20 MS. MARLATT: Yes.

21 Good afternoon. I just would like to put
22 on the record that, pursuant to the Board's request
23 much earlier in these hearings, we have met with
24 Nan/Treaty #3, MRJBC, Northwatch, and several other
25 intervenors, and we are confident they have covered the

1 areas that we wanted to cover in our cross-examination,
2 so we are satisfied at this point with the record as it
3 is.

4 THE CHAIRMAN: Thank you.

5 Is Mr. Wood here? Do you want to
6 cross-examine?

7 MR. GRENVILLE-WOOD: Yes, Mr. Chairman.
8 My understanding was the Solar Energy Society of Canada
9 will be cross-examining next.

10 THE CHAIRMAN: Are you ready to go?

11 MR. GRENVILLE-WOOD: I'm ready to go. I
12 thought you were going to take a break now.

13 THE CHAIRMAN: Well, why don't we take a
14 break? We will take our break now and we will start in
15 15 minutes. Thank you.

16 THE REGISTRAR: This hearing will take a
17 15-minutes recess.

18 ---Recess at 3:33 p.m.

19 ---On resuming at 3:50 p.m.

20 THE REGISTRAR: This hearing is again in
21 session. Please be seated.

22 THE CHAIRMAN: Mr. Wood.

23 MR. GRENVILLE-WOOD: Mr. Chairman,
24 members of the panel, I'm Geoffrey Grenville-Wood, for
25 the record, representing the Solar Energy Society of

1 Canada.

2 CROSS-EXAMINATION BY MR. GRENVILLE-WOOD:

3 Q. The panel, I think Mr. Rothman and
4 Mr. Burke both said that Ontario is a evolving in a
5 certain way in terms of GDP and population growth and,
6 of course, other factors that would be affecting the
7 load. And my understanding - and correct me if I am
8 wrong - is that you don't assume in your calculations
9 vast changes in that evolution? Is that a correct
10 characterization of what my understanding is at least;
11 is that correct?

12 MR. ROTHMAN: A. I am not sure what you
13 mean by "vast changes."

14 Q. My understanding was that you were
15 talking about that there was a trend line and that your
16 forecasts were based, especially from a GDP point of
17 view, on a continuation of that trend line without any
18 major fluctuations or any major changes. Is my
19 understanding correct, that you don't foresee there to
20 be a fairly smooth trend line in the changes.

21 A. Our forecast is for a reasonably
22 smooth pattern of economic growth, along a trend that
23 isn't a major break from previous trends. There are
24 differences from previous trends but we don't see any
25 major brakes in the pattern.

1 Q. Now, Mr. Burke, in your examination
2 in-chief, you made reference to the fact that - I think
3 I am quoting you correctly - "greater detail of end-use
4 models permit known technology trends to be better
5 reflected in the forecast of specific end uses." Now
6 you said that on page 359, 360 of volume 2, I'm just
7 quoting you directly there.

8 You went on to give examples of new
9 technologies. And you went on to cite those and you
10 said that office equipment, personal computers -- you
11 were referring again to those technologies this
12 morning.

13 My question is to what extent have you
14 taken into account technologies that are on the other
15 end of the scale in your forecast; for example, those
16 that have the effect of reducing demand? Because my
17 understanding from your answer to questions today and
18 in direct examination was that the changes in
19 technologies and end uses were more in the area of
20 those changes that affect demand in the sense of
21 increasing demand. I would like to know how much you
22 took into account technological change at the other end
23 of the scale.

24 MR. BURKE: A. I think we were talking
25 about -- the question this morning related to factors

1 which would, in fact, increase demand and so that's
2 where the examples came from. But clearly there is a
3 wide range of technologies that reduce demand that are
4 considered in preparing the end-use forecast, more
5 efficient lighting, more efficient motors, this sort of
6 thing is all considered in preparing the end-use
7 forecast.

8 DR. BUJA-BIJUNAS: A. Excuse me. There
9 are also other considerations such as -- well, for
10 example, when you do end-use forecasting, you are
11 looking at that particular service provided by the end
12 use, and so an end use is cooking. Traditionally,
13 cooking has been done by the normal stoves that you
14 purchase.

15 In this year's forecast what we did was
16 we looked at the --

17 Q. Sorry, may I just interrupt? In
18 which forecast?

19 A. In this year's.

20 Q. This year's, okay.

21 A. In the 1990 forecast.

22 One thing that we did was look at the
23 impact of microwaves as a way of decreasing energy
24 consumption for the cooking end use. So granted,
25 microwave ovens do use electricity, but when you

1 compare that electricity use and the amount of
2 electricity required to do the cooking function,
3 compared to traditional ovens, the net result is to
4 produce the same level of cooking, the penetration of
5 microwaves, microwave ovens leads to a decrease
6 compared to what would happen if you just used
7 traditional stoves. So that sort of consideration, for
8 example, was incorporated.

9 The other thing is with this growth of
10 "other" in the residential sector, it's not the case
11 that we are assuming there's going to be an unlimited
12 uptake of all sorts of electricity-using devices.

13 One other thing we consider is the fact
14 that, for example, if everybody had a TV set as well as
15 a stereo system and a VCR and a number of other
16 entertainment units, somewhere along the way you run
17 out of the capability of doing all these things all at
18 the same time.

19 So that sort of thing has to be factored
20 into an end-use analysis as well, so it not an
21 unbridled take-up of all sorts of appliances. We do
22 consider things that decrease use that are lifestyle
23 associated.

24 Q. Well, let's get specific then on some
25 of these. What about looking at such things as solar

1 technologies. To what extent were they taken into
2 account in your forecast?

3 A. Solar technologies were taken into
4 account in the 1988 forecast. At that point we were
5 using an end-use model which did specifically address
6 the possibility of solar heating and solar water
7 heating. That's no longer the case. In REEPS, we
8 don't look at solar water heating or solar space
9 heating.

10 Going back to the 1988 forecast, one of
11 the reasons why it was not further pursued in the 1990
12 forecast was that looking at the saturation rate of
13 solar space heating, in terms of percentage of
14 households that rely on solar space heating, in 1988 it
15 was 0.02 per cent of households and it was forecast to
16 grow to 0.09 per cent of households; for solar water
17 heating, it was 0.13 per cent of households forecast to
18 grow by the end of the forecast period to 0.64 per cent
19 of --

20 THE CHAIRMAN: Can you give those again
21 for the water heating?

22 DR. BUJA-BIJUNAS: For solar water
23 heating in 1988, it was 0.13 per cent of residential
24 households going to 0.64 per cent of residential
25 households near 2010. The net impact of that

1 saturation level was very small in terms of energy
2 demand and so it wasn't pursued --

3 MR. GRENVILLE-WOOD: Q. Can you just
4 give me the figure for 1988?

5 THE CHAIRMAN: Can you just let her
6 finish?

7 MR. GRENVILLE-WOOD: Sorry.

8 DR. BUJA-BIJUNAS: And so it was not
9 pursued further.

10 The other problem was good information to
11 do this sort of modelling. We didn't seem to have the
12 data -- it didn't seem to have from the figures that we
13 had a very strong impact and so we didn't pursue it
14 further.

15 MR. GRENVILLE-WOOD: Q. Just a couple of
16 questions just to clarify something. I missed your
17 figure for the 1990 on space. What was the percentage
18 there?

19 DR. BUJA-BIJUNAS: A. It was 0.02 per
20 cent.

21 Q. 0.02. No, that's '88.

22 A. Sorry '88, 0.02 per cent of
23 households.

24 One clarification regarding that 0.02 per
25 cent. When I say solar space heating, it's solar space

1 heating, used in conjunction with another space heating
2 fuel. So it's not a hundred per cent solar; it's in
3 conjunction with, say, natural gas, conjunction with
4 electricity. But solar is relied on enough to separate
5 it out.

6 Q. The figure that I didn't get was the
7 one that you forecast--

8 A. For the year 2010?

9 Q. --for 2010 in the space.

10 A. It goes to 0.09 per cent.

11 I must emphasize that was the '88
12 forecast.

13 Q. Yes.

14 A. And we don't do it anymore.

15 Q. Now you say you didn't have
16 information available to you to -- one of the reasons
17 why you didn't do it in 1990 was you weren't satisfied
18 with the data base?

19 A. The data base, when we did the '88
20 forecast, basically -- the data base used was something
21 we refer to as the Middleton Report. That information
22 was put together in 1983 or so. It was an extensive
23 consultant report addressing end-use model data bases,
24 and it did look at solar heating and has some
25 recommendations as to appropriate saturation levels,

1 appropriate energy consumptions associated with it, et
2 cetera.

3 Basically the underlying assumptions for
4 solar space heating and water heating embedded in the
5 1988 forecast are consistent with the Middleton
6 consultant report. But we haven't pursued anything
7 beyond that particular consultant end-use study.

8 Q. Let me understand you correctly. You
9 are saying that the 1988 forecast is based upon 1983
10 data?

11 A. Basically that's correct, yes.

12 Q. And you have done no further study
13 since then?

14 A. No, we have not.

15 Q. And is there any program when you
16 were -- presumably when you were doing your analysis in
17 order to discard it in 1990, did you give any
18 consideration to assessing whether some strategic
19 decisions within Hydro could affect the percentage,
20 what you call the percentage uptake of the technology?
21 Did you have any consideration of that whatsoever?

22 A. There was no consideration that
23 something material would happen that would result in
24 households picking up solar as a technology at a rate
25 different than the rate that they were taking it up

1 historically.

2 Q. If I understand you correctly, you
3 are saying nothing material would happen. You are
4 saying that nothing material external to Hydro would
5 happen? Is that my understanding? That you are not
6 forecasting any material external to Hydro affecting
7 your forecasting with respect to this technology?

8 Is my question clear? I would be happy
9 to clarify it if it isn't.

10 A. I would appreciate that, yes.

11 Q. What I mean by external to Hydro,
12 that there is something happening outside of the
13 confines of the corporation--

14 A. I see.

15 Q. --that would impact upon your
16 forecasting.

17 When I talk about internal to Hydro, then
18 maybe you make some policy decision with respect to
19 incentive programs or the like.

20 A. Basically, a general assumption was
21 made. Whether it was forces outside or internal to
22 Hydro that there would not be a change in direction in
23 terms of the rate at which households would choose
24 solar as a space or water heating option, whatever
25 reason would cause that break.

1 Q. So, my understanding then - let me
2 just see if I have this completely clear - is that in
3 1988 the net impact according to you was very small?

4 A. That's correct.

5 Q. And then because of the small nature
6 of this impact, the 1990 one, the relevance of 1990 we
7 haven't yet established with respect to the DSP, but
8 put that aside, the 1988 forecast indicated that the
9 impact would be very small, so you discarded it in
10 1990. Is that my understanding?

11 A. It's the word "discard" that bothers
12 me a bit.

13 Q. That's my understanding. Please
14 correct me if I am wrong.

15 A. Yes, the analysis of the impact of
16 solar heating using the 1988 framework, the model that
17 we had in place, indicated that the impact would be
18 very small. That coupled with the fact that the data
19 we had wasn't very extensive made efforts at further
20 modelling -- directed our efforts at modelling in other
21 areas where we might have had more information.

22 Also the new REEPS model comes from the
23 United States, which actually is in many ways an area
24 where you might expect some effort in the solar heating
25 area, does not come with any separate analysis for

1 solar or water heating, and so it was a combination of
2 all those factors which led us to concentrate on other
3 areas rather than solar and water heating, solar space
4 and water heating.

5 It wasn't so much a matter of wanting to
6 disregard or discard something, it was a matter of
7 where the priorities of things stood and where we had
8 information available, and given that the impacts
9 seemed to be small, we concentrated on other areas
10 instead.

11 Q. Would you not agree, though -- let me
12 just ask you this: Would you not agree that solar
13 technology is an environmentally benign technology,
14 especially in the active and passive solar technology.
15 Was that not something we can agree on?

16 A. I am afraid I can only answer as a
17 layman in that area.

18 Q. Probably no more of a layman than I
19 am.

20 A. But, I would have to say that that's
21 correct, but I am a layman as far as the production of
22 photovoltaics, et cetera, so there's some energy
23 consequences, et cetera, there which I cannot answer
24 to.

25 Q. In the process of doing your

1 forecast, this is something I am frankly struggling
2 with, do you not take into account the environmental
3 impact of these technologies with a view to saying that
4 if we were to spend more resources on making this
5 available, whether they be the resources in economic
6 terms or maybe just in marketing terms or whatever,
7 whatever way you want to define resources, if we were
8 to spend more resources in this area, we may have
9 certain impact on the load forecast.

10 Does that sort of question not get asked
11 in doing your analysis?

12 Feel free to answer, Mr. Burke, if you
13 feel like it.

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1 [4:07 p.m.] A. I guess the way we look at things, I
2 think it came up in previous testimony, is that we look
3 at technologies based on the economics of the
4 technology, whether it's low upfront capital costs,
5 which is why baseboards appeal to people, or whether
6 its long-term low operating costs.

7 When it comes to the appropriateness of
8 technology in the way that you were discussing it,
9 that's more of a government policy issue, because in
10 essence, you are making a judgment regarding the
11 appropriateness of various technologies based on
12 environmental considerations.

13 When we do it we look at the
14 attractiveness of an option to an average householder
15 who looks at spending money on something and looks to
16 see how much upfront capital he or she might have and
17 how much it is going to cost him in the long run.

18 Q. You are telling me you have no
19 figures on that, so how could you make that kind of
20 comparison? You have no figures to tell me. I don't
21 know what the Middleton Report says in 1983 on this
22 point, but you are telling me you made a comparison as
23 to what the consumer might wish or wish not to do based
24 upon the upfront costs to them and the returns on that
25 upfront cost. I presume that's what you are saying?

1 And then you have said that there are
2 other technologies that you can take into account but
3 solar technology is one you didn't take into account.
4 It seems to me you have no figures upon which to draw
5 that conclusion, is that not correct? Because you
6 haven't got figures since 1983 on those questions?

7 MR. BURKE: A. Hydro, other parts of
8 Hydro have looked at the economics of solar for heating
9 and I guess electricity supply. Maybe I am confusing
10 them.

11 Certainly, other parts of Ontario Hydro
12 have looked at the economics of photovoltaic systems.
13 Maybe I am stepping in here where I shouldn't.
14 Certainly for photovoltaic systems I believe there is a
15 conclusion that except in remote communities where the
16 cost of electricity is much higher when it is supplied
17 through diesel fuel flown in, the economics of
18 photovoltaics are -- they are only marginal in that
19 context and certainly are not economic on the new grid.

20 But I think -- as I was answering I
21 realized that the information that I am thinking of
22 refers to photovoltaics as opposed to solar space and
23 water heating. Certainly, the studies that were done
24 in the early '80s suggested that there was a
25 significant premium associated the use of these

1 technologies and premium cost associated with the use
2 of these technologies for space and water heating
3 purpose.

4 DR. BUJA-BIJUNAS: A. I...

5 Q. Just a second. I just want to take
6 up with what Mr. Burke said without losing that flow,
7 and I will come back to you, if you don't mind.

8 You referred to photovoltaic analyses.
9 Now, what analyses are you talking about? I am
10 interested to know on what your basing your answer,
11 what information you have and where it is?

12 MR. BURKE: A. Well, I don't have a
13 specific report that I can cite for you, but, in fact,
14 in the course of looking into the matter of the remote
15 communities, it became clear that Ontario Hydro has, in
16 fact, established in one community several -- I think
17 ten houses have been equipped with photovoltaic panels
18 for the purpose of supplying an alternative source of
19 electricity to that community. I could find the name.
20 I think it is Big Dog Lake.

21 The exploration of solar as an option was
22 considered in the Demand/Supply Option Study and I
23 think in broad terms was not pursued on the grounds of
24 cost as a supply option, that is an electricity supply
25 option. I think it has been used -- at least for bulk

1 electricity system, but I think it was indicated in the
2 Demand/Supply Option Study that it might be economic
3 for remote communities, and I believe it has been
4 demonstrated in one community, at least, in Northern
5 Ontario. That is the particular example that I am
6 thinking of.

7 Q. Following that through, would that
8 then follow that in your DSP, the forecast on which
9 that is based, that the provision of that kind of
10 remote situation through photovoltaics is taken into
11 account?

12 A. I believe that in the hierarchy of
13 these studies, the option to consider photovoltaics was
14 analyzed initially in the Demand/Supply Option Study,
15 and for the bulk system it was rejected as an option,
16 the technology --

17 Q. So for the 1988 load forecast upon
18 which the DSP is based, there is is no allowance
19 whatsoever for photovoltaic supply?

20 A. The load forecast would not include a
21 supply option.

22 Q. Through photovoltaic?

23 A. That's right. Well, I think the
24 context in which which photovoltaic was analyzed by
25 Ontario Hydro was as a supply option. I think the line

1 gets to be fairly fine and probably the closest a
2 analogy is to load displacement non-utility generation
3 and I am not aware that they are including
4 photovoltaics as a source of demand reduction by
5 customers. But that is something that we could
6 subtract from our basic load forecast, that is the
7 basic demand for electricity that our customers have.
8 I am not aware that the non-utility generation people
9 are considering photovoltaic for that purpose.

10 Q. So just to be sure I understand it,
11 because you have referred to two different things here.
12 One was demand the other was supply in the same
13 sentence. Now, with respect to supply, the answer is
14 there is none contemplated; is that correct?

15 A. That is my understanding. Maybe you
16 should be asking the planners specifically.

17 Q. We will. We will be asking the
18 planners, don't worry. I am asking what your
19 understanding is. On the demand side you think there
20 may be some but you are not sure what. That's what I
21 thought you said.

22 A. No. Another category where it might
23 come up is in the category of load displacement
24 non-utility generation and I am not aware of it coming
25 up in that category. So the only option left is, we

1 are back to the basic load forecast and the sorts of
2 things that Dr. Buja-Bijunas was talking about.

3 Q. Okay. So if you haven't lost your
4 train of thought, could you come back to what you are
5 going to say a minute ago?

6 DR. BUJA-BIJUNAS: A. I lost it, I'm
7 sorry. Maybe it will come back to me.

8 Q. Okay. My understanding of what you
9 said earlier was that the decision to exclude solar
10 from the 1990 forecast was based on an analysis of
11 priorities, correct?

12 A. That's correct, yes.

13 Q. So can I take from that then that in
14 the hierarchy of priorities on demand reduction
15 techniques, that solar is therefore very low on the
16 list?

17 A. I would rephrase that because you
18 alluded to this hierarchy. The priority that we
19 ascribe to solar, the priority in terms of how much
20 time and resource we ascribe to pursuing this is
21 related to it's demand reduction measure.

22 We have priorities for a lot of work and
23 we put it lower than, for example, the amount of time
24 we spent in looking or trying to quantify the growth
25 of, for example, the other appliance category in the

1 residential sector or the growth of office equipment in
2 the commercial sector, noting the size of those end
3 uses and how much work would be required in defining
4 the data for those end-uses, and the impact of those
5 end uses on a load forecast versus what we saw in 1988
6 of what looked like the impact of solar space heating
7 and water heating on the load forecast.

8 We decided to spend more time on these
9 other categories, to define those, because we felt
10 there are uncertainties there that might have a larger
11 impact on the load forecast. It wasn't because we
12 somehow didn't feel solar space heating and water
13 heating was an important category. It's the relative
14 size and impact on the load forecast.

15 Q. You are not going to hurt my
16 feelings. I just want to know what the facts are in
17 terms of how did your analysis. I am more concerned to
18 understand that you were basing your information on
19 1983 data.

20 A. That is quite true. The last time we
21 pursued it --

22 Q. As a result, you decided on a list
23 of -- it must be a comparative list of priorities, that
24 based on this data you weren't going to do anything
25 more about it and you were going to concentrate your

1 your resources and analysis in other areas. That's
2 seems to me what I understood from what you were
3 saying?

4 A. That's an accumulate description.

5 Q. Okay. Thank you.

6 Now is it, I understand from what Mr.
7 Burke said a moment ago, that essentially photovoltaic,
8 there is very little account of it taken in the load
9 forecast. What about active and passive, is there any
10 measurable number that you have put into load forecast
11 that is a demand reduction as a result of the use of
12 either active or passive solar technologies? Do you
13 have any numbers either disaggregated or aggregated as
14 the economists like to say?

15 A. Excuse me a minute, sorry.

16 When it comes to passive, in essence, the
17 effect is captured indirectly. There are thermal
18 envelope impacts for the house, and to the extent that
19 the energy consumption of a typical dwelling is
20 impacted by the envelope considerations, you know,
21 those figures do change with the years based on actual
22 measurements, actual consumption.

23 So it would capture any efforts to design
24 a home, et cetera, to optimize passive use of solar
25 heating. So it's not a direct, you know, number so

1 much as an evolution of consumption figures over the
2 years that would indicate how the envelope does impact.

3 Q. Do you have an answer on active?

4 A. To the extent that I have this '88
5 forecast, I can give you the percentage of total energy
6 demand due to solar space heating. In '88 it was .007
7 per cent of space heating demand. In the year 2010 it
8 was forecast to go to .04 per cent of space heating
9 demand.

10 THE CHAIRMAN: The first one was .007?

11 DR. BUJA-BIJUNAS: .007 per cent of space
12 heating demand.

13 MR. BURKE: Essentially, I think what Dr.
14 Buja-Bijunas is saying, is the amount of energy
15 supplied by active solar space heating is what would
16 displace -- well, I guess we are not even sure if its
17 electricity or natural gas, some other fuel. So that
18 if you are asking how much is our load forecast reduced
19 by the supply of active solar space heating, it
20 probably is less than that number, but it's hard to say
21 exactly whether solar space heating is being undertaken
22 in houses that are backed up by gas or backed up by
23 electric?

24 DR. BUJA-BIJUNAS: Actually our estimate
25 was that there would be -- most of the solar would be

1 backing up electrically-heated homes.

2 MR. GRENVILLE-WOOD: Q. So there may be
3 a direct link then.

4 And that again is based on the 1983
5 study?

6 DR. BUJA-BIJUNAS: A. That's right.

7 Q. Now, is it fair to conclude then from
8 what you have been telling me and based on what Mr.
9 Rothman said earlier in terms of the trend, that you
10 are not looking to a wholesale switch of domestic water
11 heaters, domestic solar, you are not look to see that
12 happening in the foreseeable future?

13 A. That is correct.

14 Q. So, therefore, the conclusion that
15 one is to draw from that is that no efforts are being
16 made within Hydro to assist in the conversion to the
17 use of domestic water heaters?

18 MR. BURKE: A. I believe that we do not
19 have a program to assist people to convert to domestic
20 solar hot water heating at this point. I think we may
21 be doing some research - I am not sure - about that.

22 But I think one the considerations here
23 is the economics, not just in absolute terms but
24 relative to other efficiency improvement measures. It
25 may be more cost-effective to promote the efficiency of

1 the existing water heaters rather than to financially
2 support solar water heaters.

3 So that it is not that we are
4 anti-efficiency or anti-reducing electricity demand in
5 water heating; it may be that solar water heating is
6 not the cost-effective approach to take.

7 Q. How can you say that since you don't
8 have any studies since 1983?

9 MR. B. CAMPBELL: You are asking
10 questions of one department only. I think he has
11 referred to the fact that he believes there may have
12 been some work done in research.

13 THE CHAIRMAN: How do you know that if
14 you haven't done anything since 1983, was the question.

15 MR. BURKE: Well perhaps, in the context
16 in which you are asking, that is that there is some
17 sort of Hydro or government supported efforts, this is
18 more properly a matter for our DSM programs. That is,
19 our sort of incentive driven efficiency improvement or
20 load reduction, however you want to view it, and we
21 should talk about it in Panel 4. Because in the basic
22 load forecast, we have assumed that the economics of
23 solar are such that it is not going to have much of a
24 share in the market, and if it takes incentive programs
25 to cause it to have a much larger role in Ontario's

1 energy future, then really it's not part of the basic
2 forecast, certainly if it's Ontario Hydro that is
3 supplying the incentives.

4 MR. GRENVILLE-WOOD: Q. You are saying
5 something, with respect I suggest, you are making a
6 leap in logic that I don't completely follow.

7 You have said that if it would require
8 incentive programs and therefore Ontario Hydro has
9 concluded that had this wouldn't be economically viable
10 is another way of putting what you said, I suppose, the
11 question that comes to my mind when you put that to me
12 is, on what basis can you reach that conclusion? How
13 do you know that in fact it would require any kind of
14 incentive if you have no figures, no analysis, except
15 from 1983?

16 MR. BURKE: A. The 1983 figures are not,
17 as I understand them -- I think they represent cost
18 figures for the technology. They are not market price
19 as such. I suppose it is possible the technology may
20 have evolved for space and water heating, but
21 effectively, yes, that is an assumption we have made,
22 that there has not been a dramatic reduction in the
23 cost of solar space and water heating costs.

24 ...
25

1 [4:28 p.m.] Q. And that assumption has been made on
2 figures that are now, in terms of your 1990 forecast,
3 seven years old?

4 A. Yes, that's correct.

5 Q. Just as a matter of interest, my
6 associate has brought to my attention something that I
7 had intended to ask you but the way you have put it
8 sort of raises it to mind.

9 In the response to Interrogatory 7.14.22,
10 you indicated, Ontario Hydro did, that with respect to
11 photovoltaic --

12 THE CHAIRMAN: They may not have that.
13 That's Panel 7; right?

14 MR. B. CAMPBELL: Panel 7, yes.
15 Some of these technologies I know are going to be
16 spoken to in that panel.

17 MR. GRENVILLE-WOOD: I am just using this
18 for illustrative purposes. It will be on the record --

19 THE CHAIRMAN: All I'm just telling you
20 is that the panel do not, neither do we, have the
21 question, so you will have to frame your question in a
22 way that they can understand it and respond to it,
23 because they won't have the question in front of them.

24 MR. GRENVILLE-WOOD: Thank you, Mr.
25 Chairman. I understand that. That was why I wasn't

1 going to refer to it, but it just sort of fits in very
2 nicely here. I will just put it for illustrative
3 purpose.

4 It's called "A Decade of Photovoltaics in
5 Ontario Hydro," written by Per Drewes, who is an
6 alternative energy design specialist at Ontario Hydro.
7 I repeat, this is the answer to Interrogatory 7.14.22.

8 There were some comparative figures here.
9 Cost of the modules in 1983 was indicated at \$12.50 per
10 peak watt. In 1986 at Big Trout Lake -- this was at
11 Kortright residential photovoltaic power supply, 1983.
12 Big Trout Lake in 1986 was \$10 per peak watt-hour. In
13 1989 at Long Dog, which you referred to earlier, is a
14 residential photovoltaic, in 1989 the cost was \$6.50
15 per peak watt. So you can see a dramatic reduction in
16 cost?

17 MR. BURKE: A. For photovoltaics?

18 Q. For photovoltaics.

19 Just in your own internal studies, you
20 have come up with those conclusions, so I find it
21 interesting that no further studies were undertaken in
22 the other areas as well.

23 A. I am clearly not an expert in the
24 costs of solar heating systems, but I put it -- my
25 understanding is that the sort of technology changes in

1 photovoltaics have to do with the conversion devices
2 themselves, the technology involved; whereas, my
3 understanding of the research that went into solar hot
4 water heating, which was in this climate, as I
5 understand it at the time in the early 80s explored
6 quite extensively, was the preferred option relative to
7 solar space heating; that is, it was more economic than
8 solar space heating.

9 And these are very sort of mechanical
10 systems, the sort of opportunities for technological
11 improvement I believe from the sort of options that
12 were being considered in the early 80s were relatively
13 limited, and I am not surprised that photovoltaic costs
14 are falling, but I wouldn't draw an inference that
15 solar space and water heating costs would follow a
16 similar pattern.

17 Q. I am not suggesting that you can
18 necessarily draw that conclusion. I am just saying
19 that it sort of runs counter to what you were saying
20 earlier regarding the studies done in 1983 indicate
21 certain conclusions and yet your own internal studies
22 indicate a dramatic drop in those costs.

23 A. No, I think I knew enough about what
24 was in the estimates of 1983, solar space and water
25 heating costs, to understand that a fair bit of

1 analysis had been done by our own research division
2 into solar water heating costs in particular and
3 understanding when the saved energy occurs and so on
4 that -- we had a good sense of costs at that point in
5 time and the economics of solar water heating.

6 Q. At what point in time?

7 A. In the early '80s.

8 Q. Yes, okay.

9 A. And the technology changes of the
10 photovoltaics is a different category of solar system
11 and I think is much more amenable to technological
12 refinement and improvement.

13 Q. Now the next question really deals
14 with - I'm not sure which of you would like to answer
15 this - but it really deals with the nature of the
16 long-term forecasting. First of all, would you both
17 agree, or all three of you agree, that 25 years is an
18 exceptionally long time for a forecast? Is that a fair
19 statement to make of this kind?

20 MR. ROTHMAN: A. Not exceptionally long.
21 As I have said, one of our forecast suppliers regularly
22 forecasts to 2010, which is a 20-year horizon. We
23 forecast to 2015 in a 25-year horizon, so I'm not sure
24 what you mean by "exceptional." But if you mean by
25 "exceptional" that nobody else does it or anything like

1 it, the answer is no; other people do it.

2 Q. Is 20 the same as 25?

3 A. No. But I said "like it."

4 Q. Well, why did you choose 25? I guess
5 that is the simple question. Why 25?

6 A. We had some discussions about this
7 earlier. Historically, we have maintained at least a
8 20-year forecast horizon and then for the purpose when
9 the demand/supply plan became a 25-year plan, then the
10 load forecast became a 25-year load forecast.

11 Q. Now a 25-year plan looking forward.
12 You indicated earlier that you concluded that we are on
13 a relative smooth trend; absent major disruptions or
14 major dislocations, we are on a relatively smooth
15 trend.

16 Would it be fair to say that the
17 technological advances in a number of areas in the
18 last, let's say, ten years far exceed the technological
19 advances in the first 15 years of the last 25 years; in
20 other words, if you go back from 1966 and forecast to
21 1991, would it be fair to say that there is an
22 increasing pace of technological change in the latter
23 part of the forecast as opposed to the former part? In
24 your field, obviously. I am not talking about
25 necessarily other fields.

1 A. What do you mean "in my field"?

2 Q. In the field we are discussing.

3 MR. B. CAMPBELL: Forecasting? In the
4 field of forecasting?

5 MR. GRENVILLE-WOOD: We are talking about
6 forecasting growth and we are forecasting load
7 forecasts. In those two areas.

8 THE CHAIRMAN: I understand the question
9 to be that there were extensive technological changes
10 in the last 25 years, of which most occurred in the
11 latter part of that period, the last ten years. That
12 was the basis for the question.

13 MR. GRENVILLE-WOOD: That's the basis for
14 the question, Mr. Chairman.

15 THE CHAIRMAN: And I guess now you should
16 ask them the question.

17 MR. GRENVILLE-WOOD: I was just trying to
18 limit the scope so --

19 MS. PATTERSON: But you are not talking
20 about forecasting, are you, you are talking about
21 technological change as better stoves or whatever?

22 THE CHAIRMAN: That's right.

23 MR. GRENVILLE-WOOD: Precisely. In the
24 areas that are within the confidence of this panel. I
25 wasn't wondering about medical advances and so on.

1 Q. You look puzzled, Mr. Rothman. Can I
2 clarify it further for you?

3 MR. ROTHMAN: A. I remain puzzled by
4 what you mean by "in your field." I mean the field
5 that we are talking about is forecasting. I gather
6 Mr. Campbell had the same degree of difficulty.

7 THE CHAIRMAN: Well, I thought you
8 were -- excuse me to interrupt - but I thought you were
9 talking about technological change relevant to the load
10 forecast in various areas, and that is a factor you do
11 take into account.

12 MR. ROTHMAN: Yes.

13 THE CHAIRMAN: And I guess you know what
14 the foundation of the question is.

15 MR. GRENVILLE-WOOD: That's what I am
16 after.

17 MR. ROTHMAN: It's a very broad question
18 and I am not sure that I agree with your premise. If
19 we go back, say, to 1966 - it's not a bad example - and
20 think about, for example, what was happening in steel
21 production. That was a time when there was still some
22 conversion going on from open hearth to basic oxygen
23 furnace steel-making technologies.

24 The further technological advancements
25 that have occurred in steel-making technologies, as Dr.

1 Buja-Bijunas has been testifying, have been in the
2 areas of casting, continuous casting and continuous
3 slab casting, which are improvements post-steelmaking
4 process. The basic oxygen furnace remains essentially
5 the same, the technology for producing the basic steel.

6 I don't know which of those technologies
7 is the most important change, but I suspect that the
8 switch from open hearth to basic oxygen furnaces is a
9 more important technical change in steel making as is
10 the switch from ingot casting to continuous casting.

11 And the area of computers --

12 MR. GRENVILLE-WOOD: Q. Can I just
13 interrupt you before you move on to the computers,
14 because I want to deal with this.

15 Isn't the more important technological
16 change, in fact, in the area of steel the fact that we
17 are turning away from it; in fact, the steel industry
18 is becoming, as we can see in Algoma Steel going out of
19 business, technological change and other things that
20 made that industry increasingly obsolete? Isn't that a
21 technological change that has occurred more in the last
22 ten years than in the previous fifteen?

23 MR. ROTHMAN: A. I don't think that
24 industry is obsolete. Steel is still a basic input for
25 all kinds of economic activity. What happened in the

1 25 years is not that the world-wide steel industry
2 contracted but in fact that the world-wide steel
3 industry grew significantly, I suspect, but that the
4 North American share of it fell for reasons of North
5 America's failure to adopt quickly enough to some of
6 these technological changes that occurred through the
7 60s and the 70s.

8 So I am not sure that I can accept your
9 premise that there is some -- first of all, I am not
10 sure that I can quantify the premise at all; and
11 secondly, I am not sure that I can accept the premise
12 that there is some kind of aggregate pace of
13 technological change that we can somehow divine and see
14 that it is accelerating in the last ten years.

15 If we look at the kinds of things that
16 might be affected by technological change, looking, for
17 example, at the patterns of productivity growth in
18 Canadian manufacturing, the Canadian goods-producing
19 sector, or in Canada as a whole, then we can get back
20 to the patterns that I talked about in my evidence
21 in-chief. And there we did see a significant slow down
22 in productivity growth through the late '70s, mid- to
23 late '70s.

24 We attribute that to various factors
25 including increases in the labour force and slower

1 growth in capital, including the disruption of the oil
2 price shocks and the disruption of the very high
3 inflation that occurred in that period.

4 We then see a period in the 1980s of much
5 stronger productivity growth which we attribute again
6 to these more aggregate patterns. So if you want to --
7 if you wanted to attribute that faster productivity
8 growth in the '80s than in the '70s to some kind of
9 faster pace in technological change, perhaps you might
10 make that inference, you might offer that as a
11 different explanation from the ones that I have
12 offered. But I think that mine are adequate and meet
13 the observed data.

14 Q. See if I understand you. Are you
15 then trying to tell me that it is a safe bet to use a
16 25-year forecast period. And if you look backwards
17 from the starting point of that, you will say, well,
18 technological change was on a relatively even trend
19 line and therefore we can safely forecast the future
20 trend line to be along the same lines. Is that what I
21 am understanding you to say?

22 Or, as I am trying to suggest, is that
23 there is a growth in the changes in technology which
24 are affecting the economy and therefore ought to be
25 taken into account in affecting your forecasting for

1 the load?

2 A. Well, going back to the best way that
3 I can translate your discussion of technological change
4 into factors affecting the forecast, as I have said
5 earlier, we have a pattern of accelerating productivity
6 growth through the forecast period.

7 Now again we attribute that to such
8 factors as improvements in the quality of the labour
9 force and improvements in the capital-to-labour ratio
10 as a result of slower labour force growth, but it is
11 there. If you want to attribute that to faster
12 technological change than has been experienced over
13 the past 25 years, okay, we can perhaps provide that
14 explanation as well.

15 MR. BURKE: A. Maybe I will venture into
16 this a bit. I think that in the areas that affect the
17 load forecast, technology changes are driven by price
18 changes in the marketplace, they are driven by not just
19 the price changes locally but internationally.

20 One of the reasons why we have observed a
21 large increase in the efficiency of -- sorry, in the
22 availability of more efficient technologies in the
23 1980s than particularly dominated in the '60s was that
24 in the oil price shock of the 1970s, many jurisdictions
25 in other parts of the world that were dependent on oil

1 for their generation source experienced very high
2 electricity prices and that did motivate a lot of
3 technological development to improve the efficiency of
4 electricity-using devices; and some of those
5 technologies, once they reach market scale, are
6 available internationally and so impact on what is
7 available for use in Ontario.

8 The pattern of price changes in the
9 future for Ontario is not as dramatic as the price
10 changes that occurred internationally in the mid-'70s
11 as far as electricity costs in other jurisdictions, and
12 I am not particularly in a position to assess whether
13 there will be some major increase in electricity costs
14 in other parts of the world that will motivate great
15 technological change in the area of efficiency
16 improvements along the lines of what happened in the
17 mid-'70s.

18 But I think that having said all that,
19 the technology while it is motivated by price changes,
20 and certainly its implementation in the marketplace is
21 motivated by price changes, there is a sense, I think,
22 that research has to be ongoing, that knowledge
23 accumulates, and that this is a fairly steady process
24 over time and certain events perhaps trigger
25 application of technology in the marketplace.

1 [4:45 p.m.] Q. What about consumer patterns
2 motivating those changes? You alluded almost
3 exclusively to market factors in terms of presumably
4 the cost to the consumer, be it individual, industry or
5 commerce? What about other factors that come into
6 play?

7 We are going through a period, I think
8 you would agree, where there is an increasing awareness
9 of the impact of existing technologies that produce
10 power, and if you analyze the comparative value to,
11 let's say, the environmental analysis of the different
12 technologies, would that not be a motivating factor and
13 should that not be taken into account by you in your
14 load forecast? Am I clear? You look puzzled.

15 A. Maybe I can see if I can paraphrase
16 your question. Are you asking whether we should, in
17 looking at technologies that may impact on the
18 marketplace, take into account their environmental
19 benefits and assume that these will be perceived by the
20 public at some point in the future and they will
21 therefore find attractive technologies that may cost a
22 lot more but have environmental benefits and that this
23 transition in values should be reflected in the load
24 forecast, is that what you are asking?

25 Q. Well, yes and no. I guess I

1 shouldn't be discussing the question in such detail
2 with you, but nevertheless it is important for you to
3 understand it.

4 I am trying to say, is there any value
5 placed in your load forecasting process on the consumer
6 attitude to less environmentally intrusive
7 technologies? Is there any value in that and take into
8 account what intuitively we know as being an increasing
9 concern in the public domain with those issues?

10 MR. ROTHMAN: A. Let me talk for a while
11 while Mr. Burke is conferring.

12 Q. As long as it's on the point, it's
13 perfectly all right, Mr. Rothman.

14 A. I don't think, as I have said before,
15 that there is convincing evidence that there is a
16 significant shift in consumer behaviour caused by
17 increasing environmentalism. Mr. Burke has been taking
18 about the impetus towards technological change comes
19 from price. Consumers continue to react to prices and
20 incomes as they have in the past.

21 We just, armchair empiricism suggest, for
22 example, that over the last five years consumers have
23 reacted to a reduction in gasoline prices by buying
24 less and less fuel-efficient cars. So the cars on
25 offer are more fuel-efficient, the cars consumers have

1 chosen to buy are less fuel-efficient. That's true in
2 United States and it's true in Canada. That suggests
3 to me that there isn't any direct -- there isn't any
4 observable in the aggregate shift towards more
5 fuel-efficient cars on the basis of their greater
6 environmental impact. There has been a shift away from
7 them on the basis of price.

8 When people recently have attempted to
9 estimate consumption functions, if anything, they have
10 shown that savings levels have been dropping, that
11 savings levels are lower than would have been expected
12 by previous patterns. We have observed that also
13 through the 1980s. The consumer boom of the 1980s was
14 fueled by lower savings rates. Consumers had been
15 consuming more. They had been consuming higher and
16 higher fractions of their incomes, not lower and lower
17 fractions of their incomes as one might expect if they
18 were motivated by significant considerations of the
19 environmental impacts of their consumption.

20 So both from empirical research and from
21 reasonable observation of what has been happening over
22 the last five years, it just doesn't seem to be strong
23 evidence yet of a significant shift in consumer
24 behaviour caused by increasing awareness of their
25 consumption decisions on the environment, but rather

1 that they continue to respond to the determinants of
2 prices and incomes on their behaviour.

3 MR. BURKE: A. I would also --

4 Q. Just a moment, Mr. Burke, because
5 otherwise I will lose -- I would rather have you lose
6 your train of thought than me lose mine, for the
7 moment, anyway.

8 I want to pick up on that one point.
9 Essentially, what I understand you to say is that this
10 is the trend we have identified - I won't use the word
11 "trend" - that public attitudes are effectively not
12 changed in a major way, that they still respond to
13 price factors, that the market plays the role in
14 determining what technology you adopt and what
15 consumption pattern you adopt for yourself as an
16 individual or an industry.

17 Now, the question that flows from that
18 for me is, Ontario Hydro is a public corporation and it
19 has a greater, presumably, a greater public
20 responsibility than merely responding to the perceived
21 needs of the public, in a sense, does it not have a
22 greater public responsibility?

23 On the one hand, assuming and
24 understanding and knowing that certain of its
25 activities - and I don't think anyone can deny that

1 certain of Ontario Hydro's activities have an
2 environmental impact - that it should, as a matter of
3 public policy, look at alternatives to its activities
4 which have a lesser environmental impact and then bend
5 its economic power to make that attractive, if you
6 reach the conclusion that the market price is the only
7 determining factor?

8 MR. B. CAMPBELL: With respect --

9 THE CHAIRMAN: I think I know what you
10 are going to say. This a very fair question, but it is
11 not perhaps a question you should be asking
12 forecasters, if I could put it that way. I think it's
13 a planning question and it's a question that will be --
14 what panel is it, that you think it will be on?

15 MR. B. CAMPBELL: We will certainly be
16 starting up on this on Panel 4 where Hydro will
17 speaking, the qualified Hydro witnesses which will
18 include Mr. Burke on this aspect of the difference
19 between the primary and the basic forecast, will be
20 outlining how they go about making decisions to do just
21 the kind of thing that Mr. Grenville-Wood is speaking
22 of.

23 We will be dealing with that and we will
24 be dealing with other trade-offs through the balance of
25 the case, in the course of dealing with the planning

1 decisions.

2 THE CHAIRMAN: This is not a first time a
3 question like that has been asked here--

4 MR. GRENVILLE-WOOD: No, I wouldn't be
5 surprised.

6 THE CHAIRMAN: --and that's been,
7 generally, the position we have taken.

8 MR. GRENVILLE-WOOD: It was just
9 following, Mr. Chairman, from Mr. Rothman's analysis of
10 a purely market-driven analysis of the issues and it
11 was of, at least, interest to me and my client to
12 understand whether in the forecasting that Mr. Rothman
13 does, any component of that kind of public policy issue
14 arises in any way.

15 THE CHAIRMAN: I don't like to put words
16 in his mouth, every time I do it I am wrong, but I
17 think if it's identified policy that they think is
18 going to have an impact, then they will take it into
19 account. If it doesn't meet that criteria, they don't.

20 MR. ROTHMAN: Which is why --

21 MR. GRENVILLE-WOOD: Q. I presume you
22 have adopted Mr. Chairman's answer then?

23 MR. ROTHMAN: A. Yes.

24 Q. That's very wise of you.

25 MR. B. CAMPBELL: I would note that he

1 hasn't always been that wise. (laugther)

2 MR. GRENVILLE-WOOD: Well, you know the
3 road to Damascus...

4 MR. ROTHMAN: Which is why we say that we
5 do take into account environmental regulation, because
6 although consumers individually may not make such
7 choices towards environmentally -- considering the
8 effect of their actions on the environment in a
9 rational, economic, decision-making sense, because each
10 one does have only a small impact, consumers
11 collectively through the political process -- that is,
12 consumers throughout their political action can enforce
13 such choices on themselves and on others in the
14 community, and we do expect that such choices will be
15 made.

16 MR. BURKE: Can I go back to say
17 something that we were going to get back to?

18 MR. GRENVILLE-WOOD: Yes.

19 MR. BURKE: It is really only repeating,
20 though, that we have discussed earlier in a slightly
21 different context, perhaps: The fact that our forecast
22 does include various characteristics of a more
23 environmentally aware population and economy, and we
24 have talked about newspaper, paper recycling and glass
25 recycling and that sort of thing, in the forecast.

1 I think, though, that those do not count,
2 from Mr. Rothman's perspective, resulting in a radical
3 departure from the trend. I mean, they have certainly
4 reduced the pulp and paper industry's energy costs
5 significantly -- energy consumption, electricity
6 consumption significantly in the forecast versus
7 previous forecasts and so on. But in aggregate, we
8 have not, as a result of it, ended up with a load
9 forecast that is dramatically lower than previous ones
10 because of environmental effects and considerations.

11 MR. GRENVILLE-WOOD: Q. But you would
12 agree, though, would you not, that 25 years is an
13 extremely long forecast time? I don't want to upset
14 you, Mr. Rothman, by saying it's exceptionally long,
15 but it is long. Some of us here weren't particularly
16 concerned with issues like that, 25 years ago. Some of
17 us may still be, 25 years from now.

18 But the point is, that you make some
19 assumptions that the trend towards recycling, towards
20 recycling paper, recycling glass, et cetera, will have
21 merely a graduated impact on the load forecast. What I
22 am trying to put to you is, is it not fair to say that,
23 because 25 years is a long time in an area, and in an
24 era of technological change, that we may, in fact, be
25 not taking into account a geometric projection, an

1 exponential growth in technological change in a certain
2 number of areas?

3 How do you deal with that?

4 MR. BURKE: A. Well, my perception is
5 this, that technological change, in some sense, the
6 results of it are in specific instances fairly
7 unpredictable. That is, it's not clear whether
8 technological change will result in technologies that
9 render existing electricity, uses of electricity vastly
10 more efficient or may result in technologies which
11 increase the use of electricity by making other uses of
12 energy vastly more efficient when they are done
13 electrically.

14 There is no way one may focus on, well,
15 wouldn't it be possible for technology to make great
16 strides on the efficiency, the demand reduction side,
17 but our problem is we have to focus on where technology
18 change will take the total forecast, and it is not
19 clear that it is always going to be on the efficiency
20 side. It may be to affect utilization, it may be to
21 increase uses, to invent new uses that we were not
22 using at all, it may be to replace fossil-fuel uses
23 with electricity in ways that are more efficient in
24 some total energy sense or from the perspective of the
25 customer appear to be lower cost, or whatever.

1 So I am not denying that technology
2 evolved dramatically. The issue is, on net, does it
3 have an implication which is different from what we
4 have in the forecast?

5 Q. I can understand that. But the
6 question then flows to me, at any rate, are we then not
7 saying that 25 years, because of this factor, is an
8 unreasonably long time to be able to make this kind of
9 forecast, and ought we not to be considering a shorter
10 period of time, given the factors that you have just
11 identified?

12 A. I think my perspective on the
13 uncertainty in the forecast has been discussed at
14 length and essentially says that, yes, our uncertainty
15 about the outcome does increase and then past a certain
16 point in the future it perhaps isn't too meaningful,
17 whether it increases much further or not, and it
18 becomes exceedingly wide for planning purposes.

19 And I am not sure one can decide at what
20 point in the future, you know, is it 5 years from now,
21 10 years from now, 15 years from now, 20, 25, that one
22 would wish to fairly cut the analysis off because of
23 lack of confidence in the way technology was evolving.

24 Q. Maybe it's not so much lack of
25 confidence, as confidence that technology will be

1 evolving. That's the other side of the coin; isn't it?

2 A. I have great confidence that
3 technology will evolve. I just do not believe I can
4 say that it will unambiguously work to increase
5 efficiency in the use of electricity. It could have
6 other impacts which are offsetting.

7 THE CHAIRMAN: Mr. Grenville-Wood, I
8 think we should be stopping soon. Would you be a while
9 longer?

10 MR. GRENVILLE-WOOD: I am afraid so.

11 THE CHAIRMAN: Then we will have to
12 continue tomorrow morning at ten o'clock.

13 MR. GRENVILLE-WOOD: Okay.

14 THE CHAIRMAN: Could you give a rough
15 idea of how much longer you will be?

16 MR. GRENVILLE-WOOD: I had thought I
17 would be an hour.

18 THE CHAIRMAN: I recognize it's very
19 difficult to predict for various factors.

20 MR. GRENVILLE-WOOD: I think I shouldn't
21 be more than 45 minutes tomorrow, but there is not
22 guarantee on that.

23 THE CHAIRMAN: Let me call the roll.

24 We have OMAA next. Is there someone here
25 from OMAA?

1 MS. MORRISON: No one here.

2 THE CHAIRMAN: North Shore Tribal
3 Council. That's you, Ms. Marlatt?

4 MS. MARLATT: Yes.

5 THE CHAIRMAN: The Nipigon Aboriginal
6 Peoples' Association? No one from them?

7 Mrs. Mackesy is here. You are ready to
8 proceed after...

9 MRS. MACKESY: Yes.

10 THE CHAIRMAN: Mr. Hunter, I have down
11 next. Is he here?

12 MS. MORRISON: No, but I expect he will
13 be tomorrow.

14 THE CHAIRMAN: Pollution Probe?

15 MR. D. POCH: I noted that Mr.
16 Klippenstein was here earlier and he was uncertain if
17 he would have questions, but I don't imagine he would
18 be very long if he does have some.

19 MR. B. CAMPBELL: That was my impression.
20 I spoke to him as well, and he indicated that he did
21 not believe -- or his current estimate was that they
22 would not be cross-examining.

23 THE CHAIRMAN: Canadian Voice of Women
24 for Peace?

25 They are not here today.

1 And then, Ms. Couban, you will be...

2 MS. COUBAN: I will stick with my
3 original estimate of between one to two hours.

4 THE CHAIRMAN: Okay.

5 MR. D. POCH: Mr. Chairman, I should just
6 say, I had a few questions arising from the revision to
7 the bandwidth, I spoke to Mr. Campbell, tried to reduce
8 them to writing, but we both agreed that it might be a
9 lot cleaner, with the Board's leave, if I could ask
10 just a few questions constrained to that topic.

11 THE CHAIRMAN: All right, we will do
12 that. Then you may have some reply questions, will
13 you, Mr. Campbell?

14 MR. B. CAMPBELL: Yes. That would follow
15 any questions that the panel had.

16 THE CHAIRMAN: Yes.

17 MR. WATSON: Mr. Chairman, also, the MEA
18 may have some questions in re-cross.

19 THE CHAIRMAN: Just on that particular
20 issue?

21 MR. WATSON: On probably, essentially,
22 that issue, yes.

23 THE CHAIRMAN: Well, I think we better
24 define what it is, because re-cross is a privilege, not
25 a right, if I can put it that way. So you had better

1 identify...

2 I don't ask you to do it now, but be
3 prepared to identify what it is. Perhaps you could
4 tell Mr. Campbell after we adjourn.

5 MR. WATSON: Yes, that's being done, Mr.
6 Chairman.

7 MR. B. CAMPBELL: Yes. I will advise the
8 Board and my friend in advance that if it has to do
9 with matters arising out of the opportunity which MEA
10 declined to take when it was offered to them, I take
11 the position that they declined that opportunity.

12 THE CHAIRMAN: I don't want to get into
13 that now.

14 We will adjourn until tomorrow morning at
15 ten.

16 THE REGISTRAR: This hearing will adjourn
17 until ten o'clock tomorrow morning.

18 ---Whereupon the hearing was adjourned at 5:05 p.m.,
19 to be resumed on Wednesday, May 15, 1991.

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